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ABSTRACT

This task-based curriculum guide is intended to help secondary teachers provide relevant training for an entry-level job in welding. Introductory materials include background information on trade and industrial education and program goals and safety information. Descriptions follow of the construction trades program, vocational cooperative education, work experience/unpaid work experience, work experience and career exploration programs, and vocational work study. This job information is then provided: job titles and a task inventory for welding. Tasks are grouped under these five duties: performing supporting activities, setting up welding or cutting equipment, performing cutting activities, performing welding activities, and using employability skills. Duty tabs comprise the largest portion of the curriculum guide. Each task in the listing is presented in a one-page format that provides this information: duty, task, achievement indicators, criteria, tools and equipment, and resources. Other components of the curriculum guide include a tool and equipment list, a student achievement record, a class achievement record, a glossary of vocational terms, and a listing of references and resources. (YLB)

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MICHIGAN TRADE & INDUSTRIAL EDUCATION
CURRICULUM GUIDE

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INTRODUCTION

The Michigan Department of Education, Vocational-Technical Education Service, has adopted descriptions and codes for vocational-technical education programs found in the document entitled, "A Classification of Instructional Programs" (C.I.P.) National Center for Educational Statistics, February, 1981. This new coding system is required of all states in reporting data on all programs receiving funds under P.L. 94-482, the Vocational Education Amendments of 1976.

The current United States Office of Education (U.S.O.E.) coding system was discontinued at the conclusion of the 1981-82 school year. The 1982-83 school year is a transition year from the U.S.O.E. code system to the new C.I.P. Code system.

This Michigan Trade and Industrial Education Curriculum Guide uses the new C.I.P. program description code(s) and lists the entry level job titles associated with the occupational program area by the Dictionary of Occupational Titles (Fourth Edition, 1977), D.O.T. Code, and the Michigan Occupational Information System, (M.O.I.S.), Numerical Index code. NOTE: This information is located under Job Information with program description(s).

PROGRAM DEFINITIONS/GOALS

Vocational Education

The term "vocational education" means organized educational programs which are directly related to the preparation for paid or unpaid employment or for additional preparation for a career requiring other than a baccalaureate or advanced degree.[1]

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[1] The Education Amendments of 1976, Section 195(1), Public Law 94-482.

Goals of Vocational-Technical Education

(1) To provide persons with differing sex, age, racial/ethnic backgrounds, social-economic status, academic disadvantage, economic disadvantage, limited English speaking ability, physical and mental capabilities, and geographical location access to vocational-technical education training or retraining.

(2) To coordinate pre-vocational exploration, career guidance, and placement programs so that each student may make informed and realistic occupational choices and have access to quality placement programs.

(3) To provide all students with learning experiences which are realistic and sufficient in light of their occupational objective.

(4) To insure that all vocational-technical programs will be planned, monitored, and evaluated in light of actual or anticipated employment opportunities and the demand by students for programs related to their abilities and occupational objectives.

Trade and Industrial Education

A vocational education curriculum that includes programs for manufacturing, construction, mechanical service, public service, health service, technical, and fisheries occupations, that prepares a person for entry level employment, upgrading or retraining in a semiskilled or skilled trade, semiprofessional or technical occupation, not generally classified as Agriculture, Distributive, Business or Office, in the Health profession, or Consumer/Home Economics in nature.

NOTE: The occupational clusters found within the scope of trade and industrial education include skilled or semiskilled trade, craft, or occupations which directly relate to the designing, producing, processing, assembling, maintaining, servicing, or repairing of any manufactured product.

TRADE AND INDUSTRIAL EDUCATION STUDENT ORGANIZATION

VICA

The Vocational Industrial Clubs of America (VICA) is the national organization serving trade, industrial, technical, and health occupations students in the United States. VICA incorporates leadership, citizenship, and character

5

development programs and activities into the skill training offered in America's schools and taught by men and women who have worked in the occupational areas in which they now instruct their students.

VICA emphasizes respect for the dignity of work, high standards in trade ethics, workmanship, scholarship, and safety. VICA promotes understanding of the free enterprise system and encourages development of patriotism through the practice of democracy within the club.

Competitive activities in the trade skills as well as areas such as public speaking, job interview, parliamentary procedure and safety are vital aspects of VICA's program.

TRADE AND INDUSTRIAL EDUCATION CURRICULUM GUIDE

This Michigan Trade and Industrial Education Curriculum Guide is the result of a project funded by the Michigan State Board of Education and the Michigan Department of Education, Vocational-Technical Education Service. The project is located at Michigan State University in the College of Agriculture and Natural Resources' Education Institute (ANREI) and is known as the Curriculum Resource Team.

The project is directed by Dr. Chris M. Olson and Ms. Carol E. Culpepper, Faculty Specialist, Curriculum Resource Team Coordinators. They were responsible for developing the curriculum format and working with a task force leader and committee of individuals from business, industry, and education to ensure the quality of the curriculum. The development of this curriculum was monitored by Melvin France, Secondary Trade and Industrial Education Supervisor.

The names of the occupational task force leader(s) committee members, secretaries, and other support staff are acknowledged after this Introduction.

The occupational program area(s) selected for curriculum development are based on a Vocational-Technical Education Service prioritized program ranking based on employment demand, State average percent of placement, reimbursed enrollments, the number of programs, and entry level wages within the State of Michigan.

This curriculum guide was developed from the results of a statewide survey and job analysis of incumbent workers in the related occupational areas.

The curriculum guide is representative of the occupational job duty categories which list major activities and tasks performed on an entry level job. The curriculum guide contains a resource list and criteria statements which indicate the minimum standards of performance accepted as evidence of competence in completion of the task by business and industry. This is a task-based curriculum guide which helps a teacher develop a classroom management system where students learn by doing. It is based on task analysis and reflects the skills, knowledge, and attitudes that employers expect incumbent workers to possess.

The curriculum is linked to the labor market, helps the instructor open communication channels with business and industry, and manage classroom instruction where students learn "Need-to-Know" instead of "Nice-to-Know" facts.

This curriculum is adaptable for special needs/handicapped students, helps to validate the program, prepares students for entry level jobs and helps students to make career choices related to job placement.

It is the intent by all those involved in the development of this curriculum guide that it be used to provide relevant training or retraining for employment in the world of work.

The secondary occupational programs/courses in Michigan should meet the following minimum standards to assure soundness and quality of instruction:

(1) The program of instruction must be based on a consideration of the skills and knowledge required in the occupation for which the

instruction is being provided, and includes a planned logical sequence for those essentials of education or experience deemed necessary for the individual to meet an occupational objective.

(2) The program of instruction must be developed and conducted in consultation with a Local Advisory Council/Committee which has an appropriate representation of both sexes and an appropriate representation of racial and ethnic minorities found in the program area, school, and community origin. The local advisory council will advise on current job needs, relevance of programs, and courses in meeting current job needs and consult with the local educational agency in developing program application.

(3) The program of instruction will include the most up-to-date curriculum based on the competencies required in the occupation or occupational field in which the individual is being prepared, upgraded, or updated.

(4) The program of instruction will be sufficiently extensive in duration and intensive within a schedule unit of time to enable the student to develop the necessary knowledge, attitudes, and skills necessary for employment in the occupation or occupational field.

(5) The program of instruction will combine and coordinate related instruction with field, shop, laboratory, cooperative work, or other occupational experience which is appropriate to the vocational objective of the student, is of sufficient duration to develop competencies necessary for employment in the occupation or occupational field, and supervised, directed, or coordinated by a person qualified under the State Plan.

Facilities, equipment, and instructional materials:

(1) Classrooms, libraries, shops, laboratories, and other facilities, including instructional equipment, supplies, teaching aids, and other materials will be adequate in supply and quality to meet the standands approved by the State Board so that such facilities are adequate to enable those who are to be trained to meet the occupational objective for which the education is intended.

(2) If the State Board or local educational agency cannot provide adequate facilities and materials, and such are available in a business or industrial establishment, funds may be used to reimburse the local public educational agency for training programs conducted in private industry when it complies with the training standards and regulations established by the State Board. Such instruction shall be under the supervision and administration of a local public educational agency.

ACKNOWLEDGEMENT

The Michigan Trade and Industrial Curriculum Guide(s) were developed through a series of workshops held throughout the State and at Michigan State University during the 1982-83 school year.

Appreciation is given to all who have contributed their thoughts, time and energy to this curriculum project.

The Michigan Department of Education, Vocational-Technical Education Service, is indebted to the following individuals who were instrumental in the completion of this project and the development of the materials:

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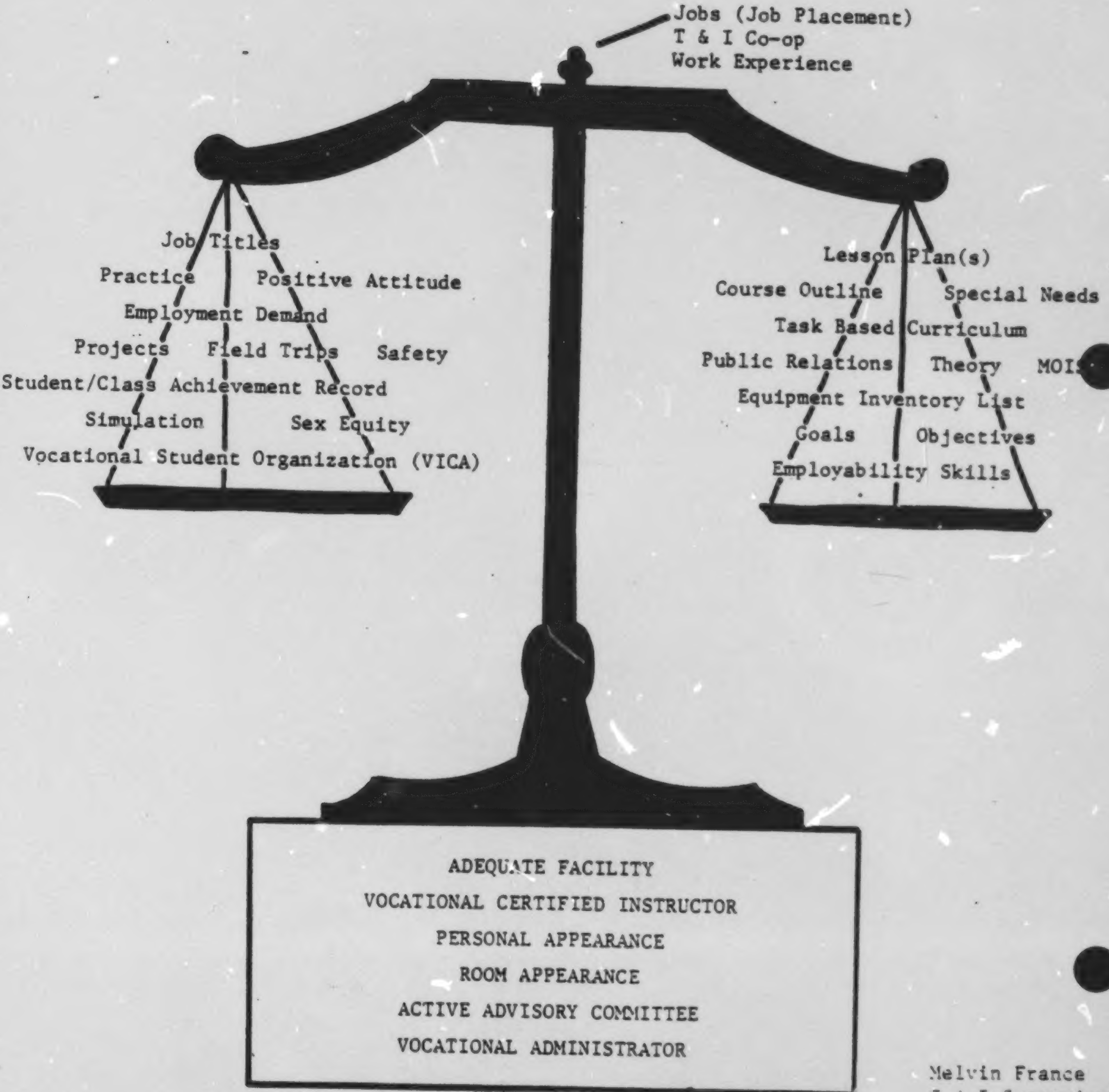
MICHIGAN TRADE AND INDUSTRIAL EDUCATION

IS YOURS A BALANCED PROGRAM?


Jobs (Job Placement)
T & I Co-op
Work Experience
Job Titles
Practice
Positive Attitude
Employment Demand
Projects
Field Trips
Safety
Student/Class Achievement Record
Simulation
Sex Equity
Vocational Student Organization (VICA)
Lesson Plan(s)
Course Outline
Special Needs
Task Based Curriculum
Public Relations
Theory
MOI
Equipment Inventory List
Goals
Objectives
Employability Skills
ADEQUATE FACILITY
VOCATIONAL CERTIFIED INSTRUCTOR
PERSONAL APPEARANCE
ROOM APPEARANCE
ACTIVE ADVISORY COMMITTEE
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DEPARTMENT OF EDUCATION

STATE BOARD OF EDUCATION

EYE PROTECTIVE DEVICES

Filed with Secretary of State,

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the state board of education by section 585a of Act No. 269 of the Public Acts of 1955, as added, being section 340.585a of the Compiled Laws of 1948.)

R 340.1301. Definitions.

Rule 1. As used in these rules:

(a) "Caustic" or "acid" means a material, exclusive of hot water or steam, capable of destroying, eroding or burning of flesh by chemical action.

(b) "Explosive material" means a substance capable of a large-scale, rapid and spectacular expansion which will propel materials in a manner causing injury to the human body.

(c) "Hot liquid" or "solid" means a material having effects that are physically harmful to the eyes.

(d) "Sanitizing" means the disinfecting and cleaning of eye protective devices before use.

(e) "When exposure to eye danger exists" means the exposure when a person is within that distance from sparks, flying particles, rays, molten metal, fumes, glare, glass breakage or chemical splash that such an object or condition could cause damage to his eyes, if he was not using a protective device.

R 340.1302. Educational courses requiring eye protection.

Rule 2. A public educational agency which enrolls students in the following courses when exposure to eye danger exists, shall furnish eye protective devices: vocational or industrial arts shops or laboratories involving the use of or working with hot molten metals, milling, sawing, turning, shaping, grinding, cutting or stamping of any solid materials; heat treatment, tempering or kiln firing of any metal or other materials; gas or electric arc welding; repair or servicing of any vehicles; caustic or explosive materials; or chemical or combined chemical-physical laboratory work involving acid, caustic or explosive chemicals or hot liquids or solids.

R 340.1303. Standards for devices.

Rule 3. (1) An eye protective device shall meet the following standards based upon the operation involved:

(a) Acetylene burning, acetylene cutting, and acetylene welding operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or welding goggles of coverspec type with tinted plate lenses. This protects against the primary hazards of sparks, harmful rays, molten metal and flying particles.

(b) Chemical handling operations - goggles of flexible fitting with hooded ventilation or face shield with plastic or mesh window. This protects against the primary hazards of splash, acid burns and fumes.

(c) Chipping operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or spectacles of metal frame with sideshields or spectacles of plastic frame with sideshields or spectacles of metal-plastic frame with sideshields or chipping goggles of eyecup type with clear safety lenses or chipping goggles of coverspec type with clear safety lenses. This protects against the primary hazard of flying particles.

(d) Electric (arc) welding operations - welding goggles of coverspec type with tinted plate lenses or welding helmets or welding helmet in combination with tinted lens spectacles. This protects against the primary hazards of sparks, intense rays and molten metal.

(e) Furnace operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or welding goggles of coverspec type with tinted plate lenses. This protects against the primary hazards of glare, heat and molten metal.

(f) Light grinding, machining, and spot welding operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or spectacles of metal frame with sideshields or spectacles of plastic frame with sideshields or spectacles of metal-plastic frame with sideshields or face shield with plastic or mesh window. This protects against the primary hazards of flying particles and sparks.

(g) Heavy grinding operations - goggles of flexible fitting with regular ventilation or goggles of cushioned fitting with rigid body or chipping goggles of eyecup type with clear safety lenses or chipping goggles of coverspec type with clear safety lenses or in case of severe exposure add face shield with plastic or mesh window. This protects against the primary hazard of flying particles.

(h) Laboratory operations - goggles of flexible fitting with hooded ventilation or face shield in combination with metal or plastic frame spectacles with sideshields. This protects against the primary hazards of chemical splash and glass breakage.

(i) Molten metal operations - welding goggles of eyecup type with tinted lenses or welding goggles of coverspec type with tinted lenses or face shield in combination with metal or plastic frame spectacles with sideshields and tinted lenses. This protects against the primary hazards of heat, glare, sparks and splash.

(2) The standards described in subrule (1) are taken from the American National Standards Safety Code Z87.1-1968, figure 8, page 28, which is available from the American National Standards Institute, Incorporated, 1430 Broadway, New York, New York 10018, at a cost of $5.00. Applicable excerpts from the American National Standards Safety Code are available at no cost from the Michigan department of education, Lansing, Michigan.

R 340.1304. Sanitization of devices.

Rule 4. An eye protective device shall be sanitized when 2 or more students use the same device, by either:

(a) Washing after each use in warm water and soap or detergent, followed by a rinse in running water.

(b) Placing in a cabinet with ultraviolet light and washing once a week as in subdivision (a).

R 340.1305. Compliance.

Rule 5. (1) A superintendent of a school district shall certify to the intermediate school district superintendent not later than the second week of each school year, on forms prescribed by the Michigan department of education, that eye protective devices meeting the standards of these rules have been obtained. For the school year 1972-73, certification shall be made within 4 weeks after the effective date of these rules. This certification shall also indicate that instructors have been informed that all students, teachers and visitors shall wear the devices when exposure to eye damage exists, as identified in these rules.

(2) An intermediate school district superintendent shall report to the state superintendent of public instruction by October 1 the names of those constituent school districts which are not in compliance with these rules. For the school year 1972-73, the report shall be made within 6 weeks after the effective date of these rules.

(3) The state superintendent of public instruction shall notify a school district in violation of these rules that it shall comply or show cause why compliance cannot be made within 30 days.

ACT NO. 54 OF THE PUBLIC ACTS OF 1972

ENROLLED SENATE BILL NO. 553

AN ACT to amend Act No. 269 of the Public Acts of 1955, entitled "The Michigan School Code", and to repeal certain acts and parts of acts, as amended, being sections 340.1 to 340.984 of the Compiled Laws of 1948, by adding section 585a.

The People of the State of Michigan enact:

Section 1. Act No. 269 of the Public Acts of 1955, as amended, being sections 340.1 to 340.984 of the Compiled Laws of 1948, is amended by adding section 585a to read as follows:

Sec. 585a. (1) Every pupil and teacher participating in a course mentioned in this section shall wear industrial quality eye protective devices, which have been sanitized prior to use, when exposure to danger exists while participating in such course. The board of education shall furnish the devices for pupils, teachers and visitors to the classrooms or laboratories. The courses for which protective devices are required are:

(a) Vocational or industrial arts shops or laboratories involving the use of or working with hot molten metals, milling, sawing, turning, shaping, grinding, cutting or stamping of any solid materials; heat treatment, tempering or kiln firing of any metal or other materials; gas or electric arc welding; repair or servicing of any vehicle; or caustic or explosive materials.

(b) Chemical or combined chemical-physical laboratory work involving acid, caustic or explosive chemicals or hot liquids or solids.

(2) "Industrial quality eye protective devices" means devices meeting the standards of the american standard safety code for head, eye and respiratory protection, Z87.1-1968, promulgated by the american standards association, incorporated.

(3) The provisions of this section shall be enforced pursuant to rules promulgated by the state board of education in accordance with and subject to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Compiled Laws of 1948.

Section 2. This amendatory act shall take effect September 1, 1972.

The following adapted from the:

NATIONAL STANDARD SCHOOL SHOP SAFETY INSPECTION CHECK LIST

Prepared by the Joint Safety Committee of the
AMERICAN VOCATIONAL ASSOCIATION — NATIONAL SAFETY COUNCIL

______________________________ Date______________

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INTRODUCTION

A *safe environment* is an essential part of the school shop safety education program. The safe environment will exist only if hazards are discovered and corrected through *regular* and *frequent* inspections by school personnel—administrators, teachers and students. Safety inspections are to determine if everything is satisfactory.

Inspections may be made at the request of the board of education, the school administration or upon the initiative of the teacher. Some communities have drawn upon the cooperative service of professional safety engineers, inspectors of state labor departments, insurance companies and local safety councils to supplement and confirm inspections by school personnel.

The National Standard School Shop Safety Inspection Check List, recommended by the President's Conference on Industrial Safety is an objective inspection procedure for the school shop.

DIRECTIONS

WHO INSPECTS?

This will depend upon local policies. It is recommended, however, that shop teachers, and students—the student safety engineer and/or student safety committee—participate in making regular inspections. This not only tends to share responsibility but stimulates a broader interest in the maintenance of a safe school shop.

WHEN TO INSPECT?

As a minimum, a safety inspection should be made at the beginning of every school term or semester. More frequent inspections may be advisable.

HOW TO INSPECT?

Inspections should be well planned in advance.

Inspections should be systematic and thorough. No location that may contain a hazard should be overlooked.

Inspection reports should be clear and concise, but with sufficient explanation to make each recommendation for improvement understandable.

FOLLOW-UP

The current report should be compared with previous records to determine progress. The report should be studied in terms of the accident situation so that special attention can be given to those conditions and locations which are accident producers.

Each unsafe condition should be corrected as soon as possible in accordance with accepted local procedures.

A definite policy should be established in regard to taking materials and equipment out of service because of unsafe conditions.

The inspection report can be used to advantage as the subject for staff and class discussion.

CHECKING PROCEDURE

Draw a circle around the appropriate letter, using the *following* letter scheme:

S — Satisfactory (needs no attention)
A — Acceptable (needs some attention)
U — Unsatisfactory (needs immediate attention)

Recommendations should be made in all cases where a "U" is circled. Space is provided at the end of the *form* for such comments. Designate the items covered by the recommendations, using the code number applicable (as B-2).

In most categories, space is provided for listing of standards, requirements or regulations which have local application only.

A. GENERAL PHYSICAL CONDITION

1. Machines, benches, and other equipment are arranged so as to conform to good safety practices.......................... S A U
2. Condition of stairways.......................... S A U
3. Condition of aisles.......................... S A U
4. Condition of floors.......................... S A U
5. Condition of walls, windows, and ceiling.......................... S A U
6. Illumination is safe, sufficient, and well placed.......................... S A U
7. Ventilation is adequate and proper for conditions.......................... S A U
8. Temperature control.......................... S A U
9. Fire extinguishers are of proper type, adequately supplied, properly located and maintained.......................... S A U
10. Teacher and pupils know location of and how to use proper type for various fires.......................... S A U
11. Number and location of exits is adequate and properly identified.......................... S A U
12. Proper procedures have been formulated for emptying the room of pupils and taking adequate precautions in case of emergencies S A U
13. Lockers are inspected regularly for cleanliness and fire hazards. S A U
14. Locker doors are kept closed.......................... S A U
15. Walls are clear of objects that might fall.......................... S A U
16. Utility lines are properly identified.......................... S A U
17. Teachers know the procedure in the event of fire including notification of the fire department and the evacuation of the building. S A U
18. Air in shop is free from excessive dust, smoke, etc.... S A U
19. ______________________________ S A U
20. ______________________________ S A U
21. ______________________________ S A U
22. ______________________________ S A U
23. Evaluation for the total rating of A. GENERAL PHYSICAL CONDITION.......................... S A U

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B. HOUSEKEEPING

1. General appearance as to orderline.......... S A U
2. Adequate and proper storage space for tools and materials. S A U
3. Benches are kept orderly.......... S A U
4. Corners are clean and clear.......... S A U
5. Special tool racks, in orderly condition, and provided at benches and machines.......... S A U
6. Tool, supply, and/or material room is orderly.......... S A U
7. Sufficient scrap boxes are provided.......... S A U
8. Scrap stock is put in scrap boxes promptly.......... S A U
9. Materials are stored in an orderly and safe condition.. S A U
10. A spring lid metal container is provided for waste and oily rags. S A U
11. All waste materials and oily rags are promptly placed in the containers.......... S A U
12. Containers for oily rags and waste materials are frequently and regularly emptied.......... S A U
13. Dangerous materials are stored in metal cabinets..... S A U
14. Machines have been color conditioned.......... S A U
15. Safety cans are provided for flammable liquids....... S A U
16. Bulk storage of dangerous materials is provided outside of the main building.......... S A U
17. A toe-board or railing around a mezzanine used for storage or washing facilities.......... S A U
18. Materials are stored in an orderly and safe condition on this mezzanine.......... S A U
19. Flammable liquids are not used for cleaning purposes S A U
20. Floors are free of oil, water and foreign material..... S A U
21. Floors, walls, windows, and ceilings are cleaned periodically. S A U
22. ______________________ S A U
23. ______________________ S A U
24. ______________________ S A U
25. ______________________ S A U
26. Evaluation for the total rating for B. HOUSEKEEPING S A U

C. EQUIPMENT

1. Machines are arranged so that workers are protected from hazards of other machines, passing students, etc.......... S A U
2. Danger zones are properly indicated and guarded..... S A U
3. All gears, moving belts, etc., are protected by permanent enclosure guards.......... S A U
4. All guards are used as much as possible.......... S A U

C. EQUIPMENT (continued)

5. All equipment control switches are easily available to [illegible]tc
6. All machines are "locked off" when instructor is out of the ro S A
7. Brushes are used for cleaning equipment.......... S A
8. Nonskid areas are provided around machines........ S A
9. Machines are in safe working condition.......... S A
10. Machines are guarded to comply with American Standards Association and local state code.......... S A
11. Adequate supervision is maintained when students are using machines and dangerous tools.......... S A
12. Tools are kept sharp, clean and in safe working order S A
13. All hoisting devices are in safe operating condition... S A
14. Machines are shut off while unattended.......... S A
15. Adequate storage facilities for tools, equipment, etc., not in immediate use.......... S A
16. ______________________ S A
17. ______________________ S A
18. ______________________ S A
19. ______________________ S A
20. Evaluation for the total rating for C. EQUIPMENT.. S A

D. ELECTRICAL INSTALLATION

1. All switches are enclosed.......... S A
2. There is a master control switch for all of the electrical installations.......... S A
3. Electrical outlets and circuits are properly identified.. S A
4. All electrical extension cords are in safe condition and are no carrying excessive loads.......... S A
5. All machine switches are within easy reach of the operators. S A
6. Electrical motors and equipment are wired to comply with th National Electric Code.......... S A
7. Individual cut-off switches are provided for each machine. S A
8. Machines are provided with overload and underload controls b magnetic pushbutton controls.......... S A
9. No temporary wiring in evidence.......... S A
10. ______________________ S A
11. ______________________ S A
12. ______________________ S A
13. ______________________ S A
14. Evaluation for the total rating for D. ELECTRIC[illegible] INSTALLATION.......... [illegible]

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E. GAS

1. Gas flow to appliances is regulated, so that when appliance valve is turned on full, the flames are not too high............ S A U

2. Gas appliances are properly insulated with asbestos or other insulating material from tables, benches, adjacent walls, or other flammable materials .... S A U

3. No gas hose is used where pipe connections could be made. S A U

4. Gas appliances have been adjusted so that they may be lighted without undue hazard.................................. S A U

5. Students have been instructed when lighting gas appliances to light the match first before turning on the gas............... S A U

6. There are no gas leaks, nor is any odor of gas detectable in any part of the shop.. S A U

7. Shop instruction has been given concerning the lighting of gas furnaces operating with both air and gas under pressure.. S A U

8. When lighting the gas forge, goggles are worn....... S A U

9. When lighting the gas furnace, the following procedure is used: (a) light the match; (b) turn on the gas; (c) drop the match in the hole in top of the furnace............................... S A U

10. In shutting down the gas furnace, the gas valve is closed before the air valve.. S A U

11. ______________________________ S A U

12. ______________________________ S A U

13. ______________________________ S A U

14. ______________________________ S A U

5. Evaluation for the total rating for E. GAS.......... S A U

F. PERSONAL PROTECTION

1. Goggles or protective shields are provided and required for all work where eye hazards exist.......................... S A U

2. If individual goggles are not provided, hoods and goggles are properly disinfected before use.......................... S A U

3. Shields and goggles are provided for electric welding.. S A U

4. Rings and other jewelry are removed by pupils when working in the shop.. S A U

5. Proper kind of wearing apparel is worn and worn properly for the job being done.................................... S A U

6. Leggings, safety shoes, etc., are worn in special classes such as foundry, etc., when needed............................ S A U

7. Respirators are provided for dusty or toxic atmospheric conditions such as when spraying in the finishing room......... S A U

8. Provisions are made for cleaning and sterilizing respirators. S A U

9. Students are examined for safety knowledge ability.. S A U

10. Sleeves are rolled above elbows when operating machines. S A U

11. Clothing of students is free from loose sleeves, flapping ties, loose coats, etc. .... S A U

12. ______ S A U

F. PERSONAL PROTECTION (continued)

13. ______________________________ S A U

14. ______________________________ S A U

15. ______________________________ S A U

16. Evaluation for the total rating for F. PERSONAL PROTECTION. S A U

G. INSTRUCTION

1. Shop Safety is taught as an integral part of each teaching unit. S A U

2. Safety rules are posted particularly at each danger station. S A U

3. Printed safety rules are given each student.......... S A U

4. Pupils take a safety pledge........................ S A U

5. Use of a safety inspector........................... S A U

6. Use of a student shop safety committee.............. S A U

7. Use of safety contests.............................. S A U

8. Motion and/or slide films on safety are used in the instruction. S A U

9. Use of suggestion box.............................. S A U

10. Use of safety tests................................ S A U

11. Use of safety posters.............................. S A U

12. Talks on safety are given to the classes by industrial men. S A U

13. Tours are taken of industrial plants as a means of studying safety practices .... S A U

14. Periodic safety inspections of the shop are made by a student committee .... S A U

15. Men from industry make safety inspections of the shop S A U

16. Student shop safety committee investigates all accidents S A U

17. A proper record is kept of safety instructions which are given, preferably showing the signature of student on tests given in this area .... S A U

18. Rotate students on the Shop Safety Committee so that as many students as possible have an opportunity to participate... S A U

19. ______________________________ S A U

20. ______________________________ S A U

21. ______________________________ S A U

22. ______________________________ S A U

23. Evaluation for the total rating of G. INSTRUCTION S A U

H. ACCIDENT RECORDS

1. There is a written statement outlining the proper procedure when and if a student is seriously hurt......................... S A U

2. Adequate accident statistics are kept................ S A U

3. Accidents are reported to the proper administrative authority by the instructor .... S A U

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H. ACCIDENT RECORD (continued)

4. A copy of each accident report is filed with the State Department of Education .... S A U

5. Accident reports are analyzed for instructional purposes and to furnish the basis for elimination of hazards.............. S A U

6. ______________________________ S A U

7. ______________________________ S A U

8. ______________________________ S A U

9. ______________________________ S A U

10. Evaluation for the total rating of H. ACCIDENT RECORDS. S A U

I. FIRST AID

1. An adequately stocked first aid cabinet is provided... S A

2. The first aid is administered by a qualified individual S A

3. The school has individuals qualified to administer first aid. S A

4. ______________________________ S A

5. ______________________________ S A

6. ______________________________ S A

7. ______________________________ S A

8. Evaluation for the total rating of I. FIRST AID.... S A

RECOMMENDATIONS

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Revd. 6/78
Req. 10M57601

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48.0508 Welding, Brazing, and Soldering

An approved instructional program that prepares individuals to use gases and/or welding processes and to braze and solder metal parts according to diagrams, blueprints, or written specifications.

VOCATIONAL COOPERATIVE EDUCATION

Definition

"The term 'cooperative education' means a program of vocational education for persons who, through written cooperative arrangements between the school and employers, receive instruction, including required academic courses and related vocational instruction by alternation of study in school with a job in any occupational field, but these two experiences must be planned and supervised by the school and employers so that each contributes to the student's education and to his or her employability. Work periods and school attendance may be on alternate half days, full days, weeks, or other periods of time in fulfilling the cooperative program." (P.L. 94-482)

Responsibilities of School District

The local school district must meet all the Federal requirements of P.L. 94-482, Section 122; 45 CFR 104.531 through 104.533 and the State of Michigan Statutes and General School Laws listed below:

A. IT IS A PROGRAM OF VOCATIONAL EDUCATION.

"Vocational program" means laboratory, simulation or instruction based upon individually designed learning experiences in a vocational subject preparing the student for competencies required in a recognized occupation coded in accordance with the most recent vocational education listing of programs by the United States Department of Education.

B. THERE IS A WRITTEN AGREEMENT BETWEEN THE SCHOOL AND EMPLOYERS.

The Youth Employment Standards Act (P.A. 90 of 1978) governs the legal employment of minors in Michigan. In section 18 of the Act, a provision is made to allow a written agreement, or contract, to be entered into between an employer and the board of education of the school district, in which the minor is enrolled. This written agreement exempts a student from obtaining a work permit and allows the student to be legally employed in Michigan. The employment, however, shall not be in violation of a Federal Statute or regulation and a signed copy of the agreement shall be on file in the place of employment before a minor begins employment. The training agreement, in cooperative education, is the legal written agreement developed cooperatively between the employer, teacher-coordinator, student, and parent and outlines the responsibilities of the employer and student to the program and establishes the legal conditions of the student-learner's employment.

C. THERE IS INSTRUCTION (INCLUDING REQUIRED ACADEMIC INSTRUCTION) IN SCHOOL RELATED TO THE JOB IN ANY OCCUPATIONAL AREA.

The program is of sufficient duration to develop competencies necessary to prepare the learner for employment. It provides a coordinated instructional program combining supervised part-time employment and classroom instruction related to the learner's job. Related vocational instruction for cooperative education enrollees shall be scheduled weekly.

D. THE ALTERNATION OF STUDY AND WORK ARE PLANNED AND SUPERVISED BY THE SCHOOL AND EMPLOYER IN ORDER TO FURTHER THE STUDENT'S EDUCATION AND EMPLOYABILITY.

The student-learner shall be employed for an average of not less than 15 hours per week during the effective time of the individual's program. The school shall have the responsibility of providing coordination and supervision services during such time.

E. STUDENTS ARE EMPLOYED AND COMPENSATED IN CONFORMITY WITH FEDERAL, STATE AND LOCAL LAWS.

The program provides cooperative on-the-job training that (1) employs and compensates student-learners in conformity with Federal, State, and local laws and regulations and in a manner not resulting in exploitation of the student-learner for private gain, and (2) is conducted in accordance with written training agreements between local education agencies and employers.

References

Individuals requiring additional information pertaining to cooperative education principles and practices are asked to consult the Michigan Department of Education, Vocational-Technical Education Service, developed Cooperative Education Handbook available in September of 1981.

WORK EXPERIENCE

PAID WORK EXPERIENCE

Definition

Paid work experience programs are school-sponsored and supervised employment programs. Students are allowed to earn academic credit while employed in the community. The employment serves as a means of acquiring desirable work habits and attitudes towards the world of work. The employment is not necessarily related to a student's career interest and enrollment in a related vocational education program is not required.

Objectives

Paid work experience programs are designed to provide students an opportunity to:

1. Foster positive attitudes about work, school and society
2. Promote an understanding in the dignity of work
3. Develop a student's ability to understand and function in an employer-employee relationship
4. Earn wages to remain in school
5. Experience an alternative to the traditional school program

Guidelines

1. Written work agreements should be completed between the employer, student, parent and school
2. Written work agreements should be completed in conformance to all Federal, State and local laws, rules and regulations; including non-discrimination against any student because of race, color, sex, national origin or ancestry. This policy of non-discrimination shall also apply to otherwise qualified handicapped individuals
3. Related academic instruction, where possible, should be provided
4. A school work experience coordinator should be provided to serve as a liaison between the student, employee, parents and school officials
5. Academic credit should be awarded for participation in the program

Funding

The Michigan Department of Education, the Vocational-Technical Education Service does not fund paid work experience programs.

UNPAID WORK EXPERIENCE

Definition

Unpaid work experience is a school sponsored and supervised instructional technique used in vocational education programs in which students are placed with an employer for a limited time and are not compensated during the duration of the experience.

Objectives

Unpaid work experience programs are designed to provide students with an opportunity to:

1. Receive on-site exposure to various businesses and industries while participating in a related vocational education program
2. Develop a realistic understanding of the relationship between education and the world of work
3. Enhance a positive self-image
4. Assist in the selection of occupational choices
5. Expand learning opportunities by using community resources

Guidelines

1. The training, even though it includes actual operation of the facilities of the participating employer is similar to that given in a vocational school
2. The training is for the benefit of the trainee
3. The trainee does not displace a regular employee, but does work under a regular employee's close observation
4. The participating employer does not derive an immediate advantage from the activities of the trainee
5. The trainee is not necessarily entitled to a job at the conclusion of the training period
6. The trainee is not entitled to wages for the time spent in the training
7. The training is for not more than 45 hours with a participating employer during each school semester
8. The training is conducted under a written work experience training agreement between the school district and the participating employer

Funding

The Michigan Department of Education, the Vocational-Technical Education Service does not fund unpaid work experience but considers it to be an allowable instructional activity under a given vocational education program.

WORK EXPERIENCE AND CAREER EXPLORATION PROGRAM
(W.E.C.E.P.)

I. Definition

The Work Experience and Career Exploration Program (W.E.C.E.P.) is a school-supervised and administered program that includes part-time work as an integral part of an educational program aimed at motivating 14 and 15 year-old youth toward education and preparing them for the world of work.

II. Program Objectives

There are several objectives of a W.E.C.E.P. program:

A. To provide a career-oriented educational program for dropout prone youth to become oriented and motivated toward education and the world of work.

B. To increase the desire to learn and improve educational performance.

C. To develop a greater degree of self-confidence, responsibility and aid in the maturation process of the student participants.

D. To provide student participants with on-the-job learning experiences that are in harmony with their interests, needs and objectives.

E. To improve school adjustment of student participants for whom the traditional curriculum is found to be inadequate.

F. To promote personal and social adjustment of the student participants and establish emotional stability through a feeling of being engaged in worthwhile activity.

III. Instructional Content

W.E.C.E.P. programs are planned so as to include part-time work supervised by employers and school personnel, as an integrated part of the enrollee's educational program. Students receive work experience on jobs permitted or approved under Federal or State laws. Students are in class with a W.E.C.E.P. teacher-coordinator for job-related and occupational safety, including needed individualized or remedial instruction. Students also receive a minimum of 20 hours of instruction on the Michigan Occupational Information System (MOIS) and a minimum of 30 hours of employability skills instruction. The students' employment is under the supervision of W.E.C.E.P. teacher-coordinators and employers. Students receive all State required courses necessary for graduation. The W.E.C.E.P. program is planned so that the students' individual academic achievement potential is recognized.

IV. Program Organization

The Vocational-Technical Education Service, Michigan Department of Education requires that W.E.C.E.P. programs in local districts meet the following criteria:

A. Eligibility. Any student aged 14 or 15 years, whom authoritative local school personnel identify as being able to benefit from the program, shall be eligible to participate.

B. Credits. Students shall receive school credits for both in-school related instruction and on-the-job experience.

C. Size. Each program unit shall consist of 12 to 25 students to one W.E.C.E.P. teacher-coordinator.

D. Instructional Schedule. W.E.C.E.P. students will spend a minimum of four periods daily in classroom instruction including one period of 180 hours of instruction devoted to job-related and employability skill instruction, safety and career exploration. Each student will have a minimum of 20 hours of career exploration utilizing the Michigan Occupational Information System (MOIS) and have a minimum of 30 hours of instruction in employability skills training. The employability skills training will equal or exceed the employability skills performance objectives adopted, as part of Michigan Vocational-Technical Service programs. Each local district submitting a letter of application to operate a W.E.C.E.P. program will furnish to the Vocational-Technical Education Service a course outline for the related class.

E. W.E.C.E.P. Teacher-Coordinator. Each program unit shall be under the supervision of a school official to be designated for the purpose of the program as a W.E.C.E.P. teacher-coordinator, who shall generally supervise the program and coordinate the work and education aspects of the program and make regularly scheduled visits to the work stations.

F. Written W.E.C.E.P. Training Agreement. No student shall participate in the program until there has been made a written E.E.C.E.P. training agreement signed by the W.E.C.E.P. teacher-coordinator, the employer and the student. The agreement shall also be signed or otherwise consented to by the student's parent or guardian. The W.E.C.E.P. training agreement will detail job tasks and related in-school instruction. A sample W.E.C.E.P. training agreement will be submitted annually by the local district to the Vocational-Technical Education Service.

G. Provision for Health and Well-Being. Employment under W.E.C.E.P. will not interfere with the schooling of the minors or with their health and well-being.

H. Records and Reports. The names and addresses of each school and the names and addresses of each employer enrolling work experience and career exploration program students and the number of enrollees in each unit shall be kept at the Vocational-Technical Education Service's office. A copy of the written W.E.C.E.P. training agreement for each student participating in the program shall be kept in the local educational office. The records required (for this paragraph) shall be kept for a period of three years from the date of enrollment in the program and shall be made available for inspection or transcription to the representatives of the Administrator of the Wage and Hour Division. Each school district operating a W.E.C.E.P. program shall submit an annual evaluative report by June 30th, which details the results of the W.E.C.E.P. program in terms of attendance and tardiness patterns, grade point average trends and dropout statistics of the enrollees. Based on a favorable state agency evaluation, a local district will be approved on an annual basis to operate a W.E.C.E.P. program. Under no circumstances can a local district operate a W.E.C.E.P. program without first obtaining written state agency approval for the program.

I. Approved Occupations. Employment of minors enrolled in a W.E.C.E.P. program approved pursuant to the requirements of this section shall be permitted in all occupations except the following:

1. Manufacturing and mining.

2. Occupations declared to be hazardous for the employment of minors between 16 and 18 years of age in Subpart E of Part 570 Child Labor Regulations, Orders and Statements of Interpretation of the Federal Fair Labor Standards Act, and occupations in agriculture declared to be hazardous for employment of minors below the age of 16 in Subpart E-1 of this part.

3. Occupations other than those permitted under sections 570.33 and 570.34 except upon approval of a variation in individual cases or classes of cases by the Administrator of the Wage and Hour Division after notice to interested persons and opportunity to be heard.

Employment of minors enrolled in a W.E.C.E.P. program approved pursuant to the requirements of this section shall be confined to not more than 23 hours in any week when school is in session and not more than three hours in any day when school is in session, any portion of which may be during school hours.

Employment of W.E.C.E.P. participants must not have the effect of displacing a worker in the establishment of the employer. Participants in W.E.C.E.P. must be paid according to the statutory minimum wage provision of the Fair Labor Standards Act.

V. Approval of Local Programs

Local school districts desiring approval to operate a W.E.C.E.P. program must submit an annual letter of application by June 30th to the

Michigan Department of Education
Vocational-Technical Education Service
Secondary Unit
Box 30009
Lansing, MI 48909
(517) 373-3365

VOCATIONAL WORK-STUDY

Definition and Purpose

The vocational work-study program is for those students who are in need of earnings from employment in order to commence or continue their vocational education programs.

Administration

The work-study program shall be administered by local educational agencies and made available, to the extent of available funds, to all qualified youth, in the area served by such agencies, who meet requirements.

Eligible Students

Employment under the work-study program shall be furnished only to a student who (a) has been accepted for enrollment or, if already enrolled, is in good standing and in full time attendance as a full-time student in a vocational education program which meets the standards of the state board and of the local educational agency and the requirements of the state plan, (b) is in need of the earnings from such employment to commence or continue a vocational education program, and (c) is at least 15 years of age and less than 21 years of age at the date of commencement of employment and is capable in the opinion of the appropriate school authorities of maintaining good standing in a school program while employed under the work-study program.

Limitation of Hours and Compensation of Employment

No student shall be employed under a vocational work-study program for more than 20 hours in any week in which classes in which the student is enrolled are in session. Summer employment shall not exceed 40 hours per week.

Employers

Employment under work-study programs shall be for the local educational agency or for some other public agency or institution, federal, state, or local and work so performed shall be adequately supervised and coordinated and shall not supplant present employees of such agency or institution who ordinarily perform such work. In those instances where employment under work-study programs is for a federal agency or institution, the written arrangement between the local educational agency and the federal agency or institution shall state that students so employed are not federal employees for any purpose.

Amounts Spent for Employment

In each fiscal year during which the work-study program remains in effect, the local educational agency shall expend for employment of its students an amount in state and/or local funds that is not less than the average annual expenditure for work-study programs of a similar nature during the three fiscal years preceding in which the supplementary plan provisons for its work study program are approved.

Applications, Priorities, and Approval

Work-study programs shall be approved on an individual basis by the state board and shall be consistent with the policies and procedures set forth.

Applications by Local Educational Agencies

Local educational agencies shall submit project proposals to the state board staff for approval in a manner similar to other vocational education programs.

Priority of Projects

Work-study programs will be provided, insofar as financial resources are available, for the undertaking of such programs in the order determined by the application of criteria for determining relative priority of projects which shall include preference for local educational agencies serving communities having substantial numbers of dropouts and unemployed youths and may include other relevant factors such as the extent to which the local educational agencies are using guidance and counseling and other related services designed to achieve the purposes of the work-study program.

WELDING
JOB TITLES

810.384-014 Welder, Arc

1. Shielded Metal Arc Welder
2. Gas Metal Arc Welder
3. Flex Cored Arc Welder
4. Submerged Arc Welder
5. Gas-Tungsten Arc Welder
6. Plasma Arc Welder

811.786-014 Welder, Gas

1. Oxy-Fuel Welder

813.684-014 Oxy-Fuel Braze Welder

819.687-014 Welder's Helper

816.464-010 Thermal, Cutter Hand (Oxy-Fuel Cutter)

816.364-010 Arc Cutter

1. Plasma Arc Cutter
2. Air Carbon Cutter

816.482-010 Thermal-Cutting Machine Operator

812.682-010 Welding Machine Operator, Resistance

DUTY/TASK - JOB MATRIX

DUTY/TASK NUMBER	JOB TITLE														

TASK LIST FOR WELDING OCCUPATIONS

A. PERFORMING SUPPORTING ACTIVITIES

1. Operate tools, equipment, and machinery related to welding using safety results to provide a safe working environment.

2. Determine the size, shape, and location of parts using blueprints to insure proper assembly.

3. Determine the type and size of the specified weld using blueprints and welding symbols to insure proper assembly.

4. Identify type of metal using test to determine the type of metal.

5. Shape steel using oxyfuel heating equipment to remove distortion.

6. Operate tools, equipment, and machinery related to welding using procedures to perform safe and efficient operations.

B. SETTING UP WELDING OR CUTTING EQUIPMENT

1. Set up oxy-fuel welding equipment using appropriate handtools and manufacturer's specifications to prepare a work station.

2. Set up oxy-fuel cutting equipment using the appropriate handtools and manufacturer's specifications to prepare a work station.

3. Set up air-carbon cutting or gouging equipment using appropriate tools and manufacturer's instructions to prepare a work station.

4. Set up shielded metal arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

5. Set up gas metal arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

6. Set up flux cored arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

7. Set up gas tungsten arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

8. Set up submerged arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

9. Set up plasma arc welding equipment using the appropriate handtools and manufacturer's instructions to prepare a work station.

10. Set up plasma arc cutting equipment using the appropriate handtools and manufacturer's instructions to prepare a work station.

C. PERFORMING CUTTING ACTIVITIES

1. Cut metal using a hand held oxy-fuel torch to produce parts.
2. Cut metal using an automatic oxy-fuel torch to produce parts.
3. Cut metal using a hand held plasma arc torch to produce ferrous or non-ferrous parts.
4. Cut metal using an automatic plasma arc torch to produce ferrous or non-ferrous parts.
5. Cut or gouge metal using air-carbon arc equipment to produce ferrous or non-ferrous parts.

D. PERFORMING WELDING ACTIVITIES

1. Make tack welds using the oxy-fuel process to produce a welded assembly.
2. Make fillet welds in a tee or lap joint using the oxy-fuel process to produce a welded assembly.
3. Make plug or slot welds using the oxy-fuel welding process to produce a welded assembly.
4. Make full penetration groove welds using the oxy-fuel process to produce a welded assembly.
5. Weld pipe using the oxy-fuel welding process to produce a welded assembly.
6. Apply hard surfacing material using the oxy-fuel welding process to produce a wear resistant surface.
7. Braze weld metal using the oxy-fuel process to produce a welded assembly.
8. Silver braze ferrous and nonferrous metals using the oxy-fuel process to produce a welded assembly.
9. Make tack welds using the shielded metal arc welding process to produce a welded assembly.
10. Make fillet welds in a tee or lap joint using the shielded metal arc welding process to produce a welded assembly.
11. Make plug or slot welds using the shielded metal arc welding process to produce a welded assembly.
12. Make full penetration groove welds using the shielded metal arc welding process to produce a welded assembly.

D. PERFORMING WELDING ACTIVITIES (continued)

13. Weld pipe using the shielded metal arc welding process to produce a welded assembly.

14. Apply hard surfacing material using the shielded metal arc welding process to produce a wear resistant surface.

15. Make tack welds on ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

16. Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

17. Make plug or slot welds using the gas metal arc welding process to produce a welded assembly.

18. Make full penetration groove welds in ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

19. Weld ferrous or nonferrous pipe using the gas metal arc welding process to produce a welded assembly.

20. Make tack welds using the flux cored arc welding process to produce a welded assembly.

21. Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the flux cored arc welding process to produce a welded assembly.

22. Make plug or slot welds using the flux cored arc welding process to produce a welded assembly.

23. Make full penetration groove welds using the flux cored arc welding process to produce a welded assembly.

24. Weld pipe using the flux cored arc welding process to produce a welded assembly.

25. Tack weld ferrous or nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

26. Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the gas tungsten arc welding process to produce a welded assembly.

27. Make plug or slot welds in ferrous and nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

28. Make full penetration groove weld in ferrous or nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

29. Weld ferrous or nonferrous pipe using the gas tungsten arc welding process to produce a welded assembly.

D. PERFORMING WELDING ACTIVITIES

30. Make fillet welds in a tee or lap joint using the submerged arc welding process to produce a welded assembly.

31. Make plug or slot welds using the submerged arc welding process to produce a welded assembly.

32. Make full penetration groove welds using the submerged arc welding process to produce a welded assembly.

33. Weld pipe using the submerged arc welding process to produce a welded assembly.

34. Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the plasma arc welding process to produce a welded assembly.

35. Make full penetration groove welds in ferrous or nonferrous metal using the plasma arc welding process to produce a welded assembly.

36. Operate a resistance welding machine using the foot pedal or trigger to produce a welded assembly.

E. USING EMPLOYABILITY SKILLS

1. Investigage employment information using sources of employment information to identify employment opportunites.

2. Identify job requirements using health, physical, legal, education, and other occupational information to determine the requirements of an occupation.

3. Acquire wage information using available resources to determine the approximate entry wages, general wage range, and significant fringe benefits for an occupation.

4. Identify significant non-wage job characteristics using available resources to determine shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment and other significant job factors.

5. Explore employment opportunities using available resources to describe local, regional, and national employment opportunities for an occupation.

6. Analyze career ladder using available resources to describe job progression in an occupation.

7. Identify personal criteria with information about available alternatives using a decision-making situation and procedures and skills in decision-making to choose a job, further training or other alternatives.

E. USING EMPLOYABILITY SKILLS (continued)

8. Prepare a resume using personal information to apply for a job.
9. Write a letter of application using personal notes to apply/inquire about a job.
10. Complete a job application using personal notes to apply for a job.
11. Demonstrate appropriate dress using a knowledge of job requirements to comply with standards on-the-job dress and grooming.
12. Complete a job interview using communication and interpersonal skills to become employed.
13. Describe personal criteria using references to identify acceptable job offers.
14. Demonstrate interpersonal skills to achieve successful relationships with others.
15. Identify source of continuing education for an occupation using available resources to identify career ladder alternatives.
16. Describe job termination procedures using a knowledge of the occupational area to leave a particular job.

Duty: Performing Supporting Activities	**Duty No.** A
	Task No. 1

Task: Operate tools, equipment, and machinery related to welding using safety results to provide a safe working environment.

Achievement Indicators: The learner:

		Yes	No
1.	Made sure welding equipment was installed properly and grounded and was in good working condition -	____	____
2.	Always wore protective clothing suitable for the welding to be done -	____	____
3.	Always wore proper eye protection, when welding, grinding, or cutting -	____	____
4.	Kept work area clean and free of hazards. Made sure that no flammable, volatile or explosive materials were in or near the work area -	____	____
5.	Handle all compressed gas cylinders with extreme care. Kept caps on when not in use -	____	____
6.	Made sure that compressed gas cylinders were secured to the wall or to other structural supports -	____	____
7.	Closed the valve and marked the cylinder "empty" when compressed gas cylinders were empty -	____	____
8.	Did not weld in a confined space without extra special precautions -	____	____
9.	Did not weld on containers that had held combustibles without taking extra special precaution -	____	____
10.	Did not weld on sealed containers or compartments without providing vents and taking special precautions -	____	____
11.	Used mechanical exhaust at the point of welding when welding lead, cadmium, chromium, maganese, brass, bronze, zinc or galvanized steel -	____	____
12.	Wore rubber boots and stood on a dry insulated platform when it was necessary to weld in a damp or wet area -	____	____
13.	Made sure all electrical connections were tight and insulated if it was necessary to splice lengths of welding cable together. Did not use cables with frayed, cracked, or bare spots in the insulation -	____	____

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The learner:	Yes	No
14. Hung electrode holder on brackets provided when not in use.- Never let it touch a compressed gas cylinder -	____	____
15. Disposed of electrode stubs in proper container since stubs on the floor were a safety hazard -	____	____
16. Shielded others from the light rays produced by welding -	____	____
17. Did not weld near degreasing operations -	____	____
18. Made sure that scaffold, ladder or work surface was solid when working above ground -	____	____
19. Used safety belt or lifeline when welding in high places without railings -	____	____
20. Checked for water leakage when using water-cooled equipment -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MOSHA regulations.

Tools and Equipment:

Resources:

Duty: Performing Supporting Activities	**Duty No.** A **Task No.** 2

Task: Determine the size, shape, and location of parts using blueprints to insure proper assembly.

Achievement Indicators: The learner:

	Yes	No
1. Interpreted specifications -	____	____
2. Determined location of parts -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industry standards.

Tools and Equipment:	**Resources:**
Blueprints (detail or assembly drawings)	

Duty: Performing Supporting Activities

Duty No. A

Task No. 3

Task: Determine the type and size of the specified weld using blueprints and welding symbols to insure proper assembly.

Achievement Indicators: The learner:

	Yes	No
1. Interpreted symbols -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to AWS standards.

Tools and Equipment:
Blueprints (detail and assembly drawings)

Resources:

Duty: Performing Supporting Activities

Duty No. A

Task No. 4

Task: Identify type of metal using test to determine the type of metal.

Achievement Indicators: The learner:

	Yes	No
1. Visually inspected unknown metal -	____	____
2. Determined if unknown metal was magnetic, slightly magnetic, or nonmagnetic -	____	____
3. Inspected metal chips removed from metal using cold chisel and hammer -	____	____
4. Performed spark test -	____	____
5. Flame-tested unknown metal in conjunction with several filler metals -	____	____
6. Weighed unknown metal -	____	____
7. Compared weight with same size of known metal -	____	____
8. Determined welding temperature by heating metal in conjunction with heat indicator pencil, assuming unknown was not a monel, stainless or nickle alloy -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the supervisor's satisfaction.

Tools and Equipment:

Grinder; Hammer and Chisel; Heat Indicator Pencils; Magnet; Welding Equipment; Scale; Fuel

Resources:

Duty: Performing Supporting Activities

Duty No. A

Task No. 5

Task: Shape steel using oxyfuel heating equipment to remove distortion.

Achievement Indicators: The learner:

	Yes	No
1. Consulted work order for camber specifications -	____	____
2. Checked work area for hazards -	____	____
3. Selected/installed heating tip -	____	____
4. Checked/cleaned tip as necessary -	____	____
5. Adjusted O_2 and fuel gas pressures for heating -	____	____
6. Put on protective attire -	____	____
7. Rechecked positioning of workpiece -	____	____
8. Marked spots to be heated -	____	____
9. Ignited torch -	____	____
10. Adjusted flame -	____	____
11. Readjusted regulators as needed -	____	____
12. Marked heat spots -	____	____
13. Checked shape of material after cooling -	____	____
14. Repeated spot heating to readjust shape of material -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to specifications.

Tools and Equipment:
Oxyfuel welding equipment (previously set-up); Oxy Heating Tips; Protective Attire; Structural Beam; Work Order

Resources:

Duty:	Performing Supporting Activities	**Duty No.**	A
		Task No.	6

Task: Operate tools, equipment, and machinery related to welding using procedures to perform safe and efficient operations.

Achievement Indicators: The learner:

		Yes	No
1.	Practiced safety rules -	____	____
2.	Consulted work order for specifications -	____	____
3.	Checked work area for hazards -	____	____
4.	Marked material for cutting -	____	____
5.	Clamped workpiece into position -	____	____
6.	Positioned workpiece so that kerf was on waste side of cut line -	____	____
7.	Adjusted coolant nozzle if equipped -	____	____
8.	Inspected path of blade/wheel travel for obstructions -	____	____
9.	Cleared others from work area -	____	____
10.	Put on face shield/eye goggles as needed -	____	____
11.	Turned on power -	____	____
12.	Rechecked position of material -	____	____
13.	Adjusted flow of coolant, if in use -	____	____
14.	Made cut -	____	____
15.	Turned off power -	____	____
16.	Removed material from clamp -	____	____
17.	Cleared area of metal scraps -	____	____

Criteria: Competence in the task will be recognized when achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment: Welder's Standard Tool Kit; Power Squaring Shear; Power Cut-Off Saw; Pipe Cutter; Disc Grinder; Iron Worker; Electric Hoist; Chain Hoist; Pedestal Grinder; Drill Press; Power Rollers; Press Brake	**Resources:**

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 1

Task: Set up oxy-fuel welding equipment using appropriate handtools and manufacturer's specifications to prepare a work station.

Achievement Indicators: The learner:

		Yes	No
1.	Practiced safety rules -		
2.	Insured that cylinders were secured in position -		
3.	Removed protective caps -		
4.	Opened and closed cylinder valves quickly to vent any foreign material -		
5.	Attached regulators to culinder valves (CAUTION: All O_2 fittings are right hand thread, all fuel gas fittings (i.e., acetylene) are left hand thread) -		
6.	Backed off adjusting screws on each regulator -		
7.	Attached hoses to respective regulators -		
8.	Attached torch assembly to the other end of the hoses -		
9.	Insured that torch needle valves were turned off -		
10.	Opened acetylene cylinder valve 1/4 to 1/2 turned, leaving key wrench on acetylene cylinder valve -		
11.	Fully opened O_2 cylinder valve -		
12.	Checked for leaks -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications, MIOSHA regulations, and AWS standards.

Tools and Equipment:
Welder's Standard Tool Kit; Fuel Gas Cylinder; Fuel Gas Hoses; Fuel Gas Regulator; Combination Tank Wrench; Key Wrench; Oxygen Cylinder; Oxygen Hoses; Oxygen Regulator; Torch Assembly; Assortment of Cutting or Gouging Tips

Resources:

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 2

Task: Set up oxy-fuel cutting equipment using the appropriate handtools and manufacturer's specifications to prepare a work station.

Achievement Indicators:

The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Insured that cylinders were secured in position -	____	____
3. Removed protective caps -	____	____
4. Opened and closed cylinder valves quickly to vent any foreign material -	____	____
5. Attached regulators to cylinder valves (CAUTION: All O_2 fittings are right hand thread, all fuel gas fittings (i.e., acetylene) are left hand thread) -	____	____
6. Backed off adjusting screws on each regulator -	____	____
7. Attached hoses to respective regulators -	____	____
8. Attached torch assembly to the other end of the hoses -	____	____
9. Insured that torch needle valves were turned off -	____	____
10. Opened acetylene cylinder valve 1/4 to 1/2 turned; leaving key wrench on acetylene cylinder valve -	____	____
11. Fully opened O_2 cylinder valve -	____	____
12. Checked for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications, MIOSHA regulations, and AWS standards.

Tools and Equipment:

Welder's Standard Tool Kit; Fuel Gas Cylinder; Fuel Gas Hoses; Fuel Gas Regulator; Combination Tank Wrench; Key Wrench; Oxygen Cylinder; Oxygen Hoses; Oxygen Regulator; Torch Assembly; Assortment of Cutting or Gouging Tips

Resources:

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 3

Task: Set up air-carbon cutting or gouging equipment using appropriate tools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Secured work piece to bench as needed -	____	____
3. Connected ground lead to bench or workpiece and to power-source terminal -	____	____
4. Connected welding lead to positive power-source terminal -	____	____
5. Connected cable and air hose to electrode holder -	____	____
6. Plugged in power source -	____	____
7. Checked that hoses were not kinked or obstructed -	____	____
8. Installed electrode in holder so that electrode tip extended no more than five inches from air jets -	____	____
9. Secured cutting guide so that it was insulated from workpiece as needed -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:
Welder's Standard Tool Kit; Air-Carbon Arc Cutting/Gouging Torch; Air Hose; Air Compressor; Constant Current DC Power Supply; Clamps; Carbon Electrodes; Portable Screens, when needed; Power Leads

Resources:

Duty: Setting Up Welding or Cutting Equipment	**Duty No.** B
	Task No. 4

Task: Set up shielded metal arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Secured workpiece to bench as needed -		
3. Attached ground lead to bench or workpiece and to power source -		
4. Attached welding lead to power source and electrode holder -		
5. Plugged in power source -		
6. Checked that leads were not tangled or obstructed -		
7. Checked that portable screens were in place -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:
Welder's Standard Tool Kit; AC and/or DC Power Source; Clamps; Electrode Holder; Ground Lead; Portable Screens, when needed; Welding Lead; Electrodes

Resources:

Duty: Setting Up Welding and Cutting Equipment	**Duty No.** B **Task No.** 5

Task: Set up gas metal arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Insured that inert gas cylinder was secured in position -	____	____
3. Removed protective cap -	____	____
4. Opened and closed cylinder valve quicly to vent any foreign material from outlet port -	____	____
5. Insured that flowmeter fittings were clean -	____	____
6. Connected heater-vaporizer to gas cylinder and plugged into power source -	____	____
7. Connected flowmeter to cylinder's outlet port (or to heater) -	____	____
8. Adjusted position of flowmeter and tightened fittings -	____	____
9. Backed-off flowmeter adjusting screw -	____	____
10. Fully opened main cylinder valve -	____	____
11. Attached inert gas hose to flowmeter -	____	____
12. Checked for leaks -	____	____
13. Installed welding wire into wire-feed -	____	____
14. Threaded welding wire through feeder drive wheels and torch cable -	____	____
15. Connected wire feeder to power supply as needed -	____	____
16. Secured workpiece to bench as needed -	____	____
17. Connected ground lead to bench or workpiece and power-source terminal -	____	____
18. Connected welding lead to power-source terminal -	____	____
19. Plugged in power source -	____	____
20. Checked that hoses were not kinked or obstructed -	____	____
21. Checked that portable screens were in place -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment: Welder's Standard Tool Kit; DC Power Source; Clamps; Inert Gas Cylinder; Inert Gas Flowmeter Gauge; Hoses; MIG Gun and Cable; Portabel Screens, when needed; Power Leads; Welding Wire; Wire Feeder; Cables; Regulator Heater, if needed	**Resources:**

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 6

Task: Set up flux cored arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Insured that inert gas cylinder was secured in position -	____	____
3. Removed protective cap -	____	____
4. Opened and closed cylinder valve quickly to vent any foreign material from outlet port -	____	____
5. Insured that flowmeter fittings were clean -	____	____
6. Connected heater-vaporizer to gas cylinder and plugged into power source -	____	____
7. Connected flowmeter to cylinder's outlet port (or to heater) -	____	____
8. Adjusted position of flowmeter and tightened fittings -	____	____
9. Backed-off flowmeter adjusting screw -	____	____
10. Fully opened main cylinder valve -	____	____
11. Attached inert gas hose to flowmeter -	____	____
12. Checked for leaks -	____	____
13. Installed welding wire into wire-feed -	____	____
14. Threaded welding wire through feeder drive wheels and torch cable -	____	____
15. Connected wire feeder to power suppy as needed -	____	____
16. Secured workpiece to bench as needed -	____	____
17. Connected ground lead to bench or workpiece and power-source terminal -	____	____

The learner:	Yes	No
18. Connected welding lead to power-source terminal -	____	____
19. Plugged in power source -	____	____
20. Checked that hoses were not kinked or obstructed -	____	____
21. Checked that portable screens were in place -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:
Welder's Standard Tool Kit; DC Power Source; Clamps; Electrode Wire (gas shielded or self shielding); Ground Lead; Portable screens, when needed; Welding Lead; Wire Feeder; For Gas Shielded: Shielding Gas Cylinder; Regulator; Hose; Wire Feeder with shielding gas solenoid

Resources:

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 7

Task: Set up gas tungsten arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:

		Yes	No
1.	Practiced safety rules -		
2.	Insured that inert gas cylinder was secured in position -		
3.	Removed protective cap -		
4.	Opened and closed cylinder valve quickly vent any foreign material -		
5.	Attached regulator to cylinder valve -		
6.	Adjusted position of regulator(s) and tightened, using wrench -		
7.	Connected gas hose to regulator and gas inlet on TIG machine and/or to torch as needed -		
8.	Backed-off regulator adjusting screw -		
9.	Fully opened gas cylinder valve -		
10.	Adjusted gas pressure -		
11.	Attached water adapter to water supply -		
12.	Attached water hose to adapter and water inlet on TIG machine and/or torch as needed -		
13.	Checked for leaks -		
14.	Connected ground lead to bench or workpiece and to power-source terminal -		
15.	Inspected and positioned tungsten electrode in collet -		
16.	Installed gas cup -		
17.	Connected welding lead to power source -		
18.	Plugged in power source -		
19.	Checked that hoses and leads were not kinked or obstructed -		

The learner:	Yes	No
20. Purged gas to torch -	____	____
21. Installed purge plate(s) -	____	____
22. Connected purge hoses -	____	____
23. Checked for leaks -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:
Welder's Standard Tool Kit; AC/DC Power Supply with High Frequency; Clamps; Collets; Hoses and Fittings; Inert Gas Cylinder; Inert Gas Regulator; Inert Gas Cups; Portable Screens, when needed; Power Leads; Purge Plates; GTAW Torch; Tungsten Electrode; Water Hose and Adapter, when needed; Filler Metal

Resources:

Duty: Setting Up Welding or Cutting Equipment	**Duty No.** B **Task No.** 8

Task: Set up submerged arc welding equipment using appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Connected wire feeder to power supply as needed -		
3. Plugged in machine -		
4. Installed welding wire into wire feeder -		
5. Threaded welding wire through drive wheels of feeder -		
6. Connected ground lead to bench/workpiece and power-source terminal -		
7. Secured workpiece to bench as needed -		
8. Checked that cables were not kinked or obstructed -		
9. Checked that portable screens were in place -		
10. Filled hopper with flux -		

Criteria: Competence in the task will be recognized when achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment: Welder's Standard Tool Kit; Clamps; Electrode Wire; Flux; DC Power Source; Wire Feeder; Gun Assembly with Flux Hopper	**Resources:**

Duty: Setting Up Welding or Cutting Equipment

Duty No. B

Task No. 9

Task: Set up plasma arc welding equipment using the appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Insured that inert gas cylinder(s) were secured in position -	____	____
3. Removed protective cap(s) -	____	____
4. Opened and closed cylinder valve(s) quickly to vent any foreign material from outlet port(s) -	____	____
5. Insured that regulator fitting(s) were clean. (CAUTION: Inert gas equipment must not be interchanged.) -	____	____
6. Connected regulator(s) to cylinder's outlet port(s) -	____	____
7. Adjusted position of regulator(s) and tightened fitting -	____	____
8. Backed-off regulator adjusting screw(s) -	____	____
9. Fully opened main cylinder valve(s) -	____	____
10. Adjusted inert (plasma) gas pressure -	____	____
11. Adjusted inert (shielding) gas pressure -	____	____
12. Attached inert gas hoses to regulator(s), welding machine and torch as needed -	____	____
13. Attached coolant adapter to coolant supply if appropriate -	____	____
14. Attached coolant hose to adapter if appropriate -	____	____
15. Checked for leaks -	____	____
16. Inspected and positioned tungsten electrode -	____	____
17. Installed inert gas cup -	____	____
18. Connected ground lead to bench or workpiece and to power-source terminal -	____	____

The learner:	Yes	No
19. Connected welding lead to power-source terminal -	____	____
20. Plugged in power source -	____	____
21. Checked that hoses and leads were not kinked or obstructed -	____	____
22. Checked that portable screens were in place -	____	____
23. Secured cutting guide so that it was insulated from workpiece as needed -	____	____

Criteria: Competence in the task will be recognized when achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:

Welder's Standard Tool Kit; Clamps; DC Power Source; Inert Gas Cylinders; Inert Gas Hoses; Inert (Plasma) Gas Regulator; Inert (Sheilding) Gas Regulator; Plasma-Arc Cutting/Gouging Torch; Portable Screens, when needed; Power Leads; Tungsten Electrodes; Collets; Tugnsten Cups; Coolant Adapter/Hoses; Filler Metal; Manufacturer's Torch Tool Kit

Resources:

Duty:	Setting Up Welding and Cutting Equipment	**Duty No.**	B
		Task No.	10

Task: Set up plasma arc cutting equipment using the appropriate handtools and manufacturer's instructions to prepare a work station.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Insured that inert gas cylinder(s) were secured in position -	____	____
3. Removed protective cap(s) -	____	____
4. Opened and closed cylinder valve(s) quickly to vent any foreign material from outlet port(s) -	____	____
5. Insured that regulator fitting(s) were clean. (CAUTION: Inert gas equipment must not be interchanged) -	____	____
6. Connected regulator(s) to cylinder's outlet port(s) -	____	____
7. Adjusted position of regulator(s) and tightened fitting -	____	____
8. Backed-off regulator adjusting screw(s) -	____	____
9. Fully opened main cylinder valve(s) -	____	____
10. Adjusted inert (plasma) gas pressure -	____	____
11. Adjusted inert (shielding) gas pressure -	____	____
12. Attached inert gas hoses to regulator(s), welding machine and torch as needed -	____	____
13. Attached coolant adapter to coolant supply if appropriate -	____	____
14. Attached coolant hose to adapter if appropriate -	____	____
15. Checked for leaks -	____	____
16. Inspected and positioned tungsten electrode -	____	____
17. Installed inert gas cup -	____	____
18. Connected ground lead to bench or workpiece and to power-source terminal -	____	____

The learner:	Yes	No
19. Connected welding lead to power-source terminal -	____	____
20. Plugged in power source -	____	____
21. Checked that hoses and leads were not kinked or obstructed -	____	____
22. Checked that portable screens were in place -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications and MIOSHA regulations.

Tools and Equipment:

Welder's Standard Tool Kit; Clamps; DC Power Source; Inert Gas Cylinders; Inert Gas Hoses; Inert (Plasma) Gas Regulator; Inert (Sheilding) Gas Regulator; Plasma-Arc Cutting/Gouging Torch; Portable Screens, when needed; Power Leads; Tungsten Electrodes; Collets; Tugnsten Cups; Coolant Adapter/Hoses; Filler Metal; Manufacturer's Torch Tool Kit

Resources:

Duty: Performing Cutting Activities

Duty No. C

Task No. 1

Task: Cut metal using a hand held oxy-fuel torch to produce parts.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for specifications of cut -	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection had required lenses for cutting procedure -	____	____
5. Checked work area for hazards -	____	____
6. Checked position of catch-box -	____	____
7. Positioned/secured workpiece -	____	____
8. Selected and installed cutting tip -	____	____
9. Checked and cleaned tip as necessary -	____	____
10. Adjusted gas pressures for cutting -	____	____
11. Ignited torch -	____	____
12. Adjusted pre-heating flame -	____	____
13. Depressed cutting oxygen valve and readjusted flame as needed -	____	____
14. Closed cutting oxygen valve -	____	____
15. Positioned cutting torch at edge of workpiece -	____	____
16. Pre-heated metal to cutting temperature -	____	____
17. Depressed cutting oxygen valve -	____	____
18. Cut metal -	____	____
19. Inspected the cut -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to AWS standards and MIOSHA regulations.

Tools and Equipment:

Welder's Standard Tool Kit;
Personal Safety Equipment;
Oxy-Fuel Cutting Equipment
(Duty B, Task 2)

Resources:

Duty: Performing Cutting Activities

Duty No. C

Task No. 2

Task: Cut metal using an automatic oxy-fuel torch to produce parts.

Achievement Indicators: The learner: Yes No

1. Practiced safety rules - ____ ____
2. Consulted work order for specifications of cut - ____ ____
3. Put on protective attire - ____ ____
4. Checked that eye protection had required lenses for cutting process - ____ ____
5. Checked work area for hazards - ____ ____
6. Checked position of catch-box - ____ ____
7. Positioned and secured workpiece - ____ ____
8. Selected and installed cutting tip - ____ ____
9. Checked and cleaned tip as necessary - ____ ____
10. Positioned torch in tractor saddle - ____ ____
11. Adjusted gas pressures for cutting - ____ ____
12. Ignited torch - ____ ____
13. Adjusted pre-heating flame - ____ ____
14. Opened cutting oxygen valve and readjusted flame as needed - ____ ____
15. Closed cutting oxygen valve - ____ ____
16. Positioned cutting head at edge of workpiece - ____ ____
17. Pre-heated metal - ____ ____
18. Opened cutting oxygen valve - ____ ____
19. Started and adjusted tractor travel - ____ ____
20. Adjusted flame and travel speed as necessary - ____ ____
21. Inspected the cut - ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications for machine operations and AWS standards.

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Catch-Box; Mechanized Tractor; Oxy-Fuel Cutting Equipment (Duty B, Task 2)	

Duty: Performing Cutting Activities

Duty No. C

Task No. 3

Task: Cut metal using a hand held plasma arc torch to produce ferrous or non-ferrous parts.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Consulted work order for specification of cut -		
3. Put on protective attire -		
4. Checked that eye protection had required lenses for cutting process -		
5. Checked work area for hazards -		
6. Checked position of catch-box -		
7. Positioned and secured workpiece -		
8. Turned power source on -		
9. Adjusted polarity and amperage for materials to be cut -		
10. Purged gas to torch -		
11. Rechecked gas pressures -		
12. Initiated pilot arc -		
13. Held torch head at edge of workpiece -		
14. Established plasma arc at edge of workpiece -		
15. Melted-in -		
16. Burned metal -		
17. Inspected cut -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to specifications.

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Plasma Arc Cutting Equipment (Duty B, Task 10)	

Duty: Performing Cutting Activities

Duty No. C

Task No. 4

Task: Cut metal using an automatic plasma arc torch to produce ferrous or nonferrous parts.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for specification of cut -	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection had required lenses for cutting process -	____	____
5. Checked work area for hazards -	____	____
6. Checked position of catch-box -	____	____
7. Positioned and secured workpiece -		
8. Turned welding machine on -	____	____
9. Adjusted polarity and amperage for materials to be cut -	____	____
10. Positioned torch in tractor saddle -	____	____
11. Purged gas to torch -	____	____
12. Rechecked gas pressures -	____	____
13. Initiated pilot arc -	____	____
14. Positioned cutting head at edge of workpiece -	____	____
15. Established plasma arc at edge of workpiece -	____	____
16. Started and adjusted tractor travel -	____	____
17. Melted-in and burned metal -	____	____
18. Monitored cutting operation -	____	____
19. Reset carriage for next cut -	____	____
20. Inspected the cut -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications for machine operations and AWS standards.

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Plasma Arc Cutting Equipment; Mechanized Tractor (Duty B, Task 10)	

Duty: Performing Cutting Activities	**Duty No.** C **Task No.** 5

Task: Cut or gouge metal using air-carbon arc equipment to produce ferrous or non-ferrous parts.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for specification of cut -	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection had required lenses for cutting process -	____	____
5. Checked work area for hazards -	____	____
6. Checked position of catch-box -	____	____
7. Positioned and secured workpiece -	____	____
8. Turned power source on -	____	____
9. Adjusted polarity and amperage for materials to be cut -	____	____
10. Adjusted air pressure -	____	____
12. Turned compressed air on -	____	____
13. Initiated arc -	____	____
14. Burned metal -	____	____
15. Inspected cut or gouge -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to AWS specifications.

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipmentl Air Carbon Arc Equipment (Duty B, Task 3)	

Duty: Performing Welding Activities	**Duty No.** D
	Task No. 1

Task: Make tack welds using the oxy-fuel process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. position (flat, horizontal, vertical, overhead)		
2. Checked work area for hazards -	____	____
3. Selected and installed welding tip -	____	____
4. Checked and cleaned tip as necessary -	____	____
5. Selected welding rod -	____	____
6. Adjusted O_2 and acetylene pressures for welding -	____	____
7. Put on protective attire -	____	____
8. Rechecked positioning of workpiece -	____	____
9. Ignited torch -	____	____
10. Adjusted flame -	____	____
11. Readjusted regulators as needed -	____	____
12. Made tack weld -	____	____
13. Brushed weld as specified -	____	____
14. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when tne achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment; Oxy-Fueld Welding Equipment (Duty B, Task 1)	**Resources:**

Duty: Performing Welding Activities

Duty No. D

Task No. 2

Task: Make fillet welds in a tee or lap joint using the oxy-fuel process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. position (flat, horizontal, vertical, overhead)	____	____
2. Checked work area for hazards -	____	____
3. Selected and installed welding tip -	____	____
4. Checked and cleaned tip as necessary -	____	____
5. Selected welding rod -	____	____
6. Adjusted O_2 and acetylene pressures for welding -	____	____
7. Put on protective attire -	____	____
8. Rechecked positioning of workpiece -	____	____
9. Ignited torch -	____	____
10. Adjusted flame -	____	____
11. Readjusted regulators as needed -	____	____
12. Ran fillet weld -	____	____
13. Brushed weld as specified -	____	____
14. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Oxy-Fuel Welding Equipment (Duty B, Task 1)	

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 3

Task: Make plug or slot welds using the oxy-fuel welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____

a. edge preparation
    b. surface cleaning
    c. joint fit up
    d. preheating
    e. filler metal
    f. position (flat, horizontal, vertical,		

3. Checked work area for hazards -	____	____
4. Selected and installed welding tip -	____	____
5. Checked and cleaned tip as necessary -	____	____
6. Selected welding rod -	____	____
7. Adjusted gas pressures for welding -	____	____
8. Put on protective attire -	____	____
9. Rechecked positioning of workpiece -	____	____
10. Ignited torch -	____	____
11. Adjusted flame -	____	____
12. Readjusted regulators as needed -	____	____
13. Made plug weld -	____	____
14. Brushed by hand and/or ground weld as specified-	____	____
15. Inspected weld -	____	____

D-3

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Took Kit; Personal Safety Equipment; Oxy-Fuel Equipment; Grinder (Duty B, Task 1)	

Duty: Performing Welding Activities

Duty No. D

Task No. 4

Task: Make full penetration groove welds using the oxy-fuel process to produce a welded assembly.

Achievement Indicators: The learner: Yes No

1. Practiced safety rules - ______ ______
2. Consulted work order for weld specifications - ______ ______
    a. edge preparation
    b. surface cleaning
    c. joint fit up
    d. preheating
    e. type and size of filler metal
    f. position (flat, horizontal, vertical, overhead)
3. Checked work area for hazards - ______ ______
4. Selected and installed welding tip - ______ ______
5. Checked and cleaned tip as necessary - ______ ______
6. Selected welding rod - ______ ______
7. Adjusted gas pressures for welding - ______ ______
8. Put on protective attire - ______ ______
9. Rechecked positioning of workpiece - ______ ______
10. Ignited torch - ______ ______
11. Adjusted flame - ______ ______
12. Readjusted regulators as needed - ______ ______
13. Ran root pass - ______ ______
14. Wire brushed by hand and/or ground root pass as specified - ______ ______
15. Ran filler passes - ______ ______
16. Wire brushed by hand and/or ground weld as specified ______ ______
17. Inspected weld - ______ ______

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment; Oxy-Fuel Welding Equipment (Duty B, Task 1)	**Resources:**

Duty: Performing Welding Activities	**Duty No.** D
	Task No. 5

Task: Weld pipe using the oxy-fuel welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Checked work area for hazards -	____	____
4. Selected and installed welding tip -	____	____
5. Checked and cleaned tip as necessary -	____	____
6. Selected welding rod -	____	____
7. Adjusted gas pressures for welding -	____	____
8. Put on protective attire -	____	____
9. Prepared workpiece as required by specifications -	____	____
10. Ignited torch -	____	____
11. Adjusted flame -	____	____
12. Readjusted regulators as needed -	____	____
13. Deposited weld -	____	____
14. Cleaned weld as needed -	____	____
15. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit;
Personal Safety Equipment;
Oxy-Fuel Welding Equipment;
Filler Rods (Duty B, Task 1)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 6

Task: Apply hard surfacing material using the oxy-fuel welding process to produce a wear resistant surface.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of filler metal f. position (flat, horizontal, vertical, overhead)		
3. Put on protective clothing -	____	____
4. Positioned workpiece for welding (horizontal position if opssible) -	____	____
5. Preheated base metal for required soaking time -	____	____
6. Built up surface to within 3/16" - 3/8" of final size -	____	____
7. Applied hard surfacing material in two layers -	____	____
8. Induced cross-checking when required -	____	____
9. Post heated workpiece as required -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:
Welder's Standard Tool Kit;
Personal Safety Equipment;
Oxy-Fuel Welding Equipment
(Duty B, Task 1)

Resources:

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 7

Task: Braze weld metal using the oxy-fuel process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of filler metal f. flux g. position (flat, horizontal, vertical, overhead)		
3. Checked work area for hazards -	____	____
4. Selected and installed brazing tip -	____	____
5. Checked and cleaned tip as necessary -	____	____
6. Selected filler rod -	____	____
7. Adjusted O_2 and fuel gas pressures for brazing -	____	____
8. Put on protective attire -	____	____
9. Rechecked positioning of workpiece -	____	____
10. Sanded surfaces to remove grease/dirt as needed -	____	____
11. Applied flux to surfaces as needed -	____	____
12. Ignited torch -	____	____
13. Adjusted flame -	____	____
14. Readjusted regulators as needed -	____	____
15. Heated filler rod -	____	____
16. Dipped filler rod into flux as needed -	____	____
17. Tinned joint as needed -	____	____
18. Brazed metal components -	____	____

The learner:	Yes	No
19. Pack brazed joint for slow cooling as needed -	____	____
20. Unwrapped cooled joint -	____	____
21. Finish brazed joint as specified -	____	____
22. Inspected brazed joint -	____	____

Criteria: Competence in the task will be recognized when achievement indicators are performed according to industrial codes and specifications (i.e., Section IX ASME Code).

Tools and Equipment:
Welder's Standard Tool Kit; Personal Safety Equipment; Bare of Flux Coated Brazing Rod; Flux; Oxy-Fuel Welding Equipment (Duty B, Task 1)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 8

Task: Silver braze ferrous and nonferrous metals using the oxy-fuel process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for soldering specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of filler metal f. flux g. position (flat, horizontal, vertical, overhead)		
3. Checked work area for hazards -	____	____
4. Precleaned and fluxed joint -	____	____
5. Selected and installed soldering tip -	____	____
6. Checked and cleaned tip as necessary -	____	____
7. Selected solder -	____	____
8. Adjusted gas pressures for soldering -	____	____
9. Put on protective attire -	____	____
10. Rechecked positioning of workpiece -	____	____
11. Ignited torch -	____	____
12. Adjusted flame -	____	____
13. Readjusted regulators as needed -	____	____
14. Heated joint to approximate melting temperature of filler metal -	____	____
15. Applied solder -	____	____
16. Post-cleaned joint -	____	____
17. Checked seal and finish of joint -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., Section IX, ASME).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Oxy-Fuel Welding Equipment; Flux; Silver Brazing Material; Emery Cloth (Duty B, Task 1)	

Duty: Performing Welding Activities

Duty No. D

Task No. 9

Task: Make tack welds using the shielded metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Put on protective attire -	____	____
4. Checked that hood had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Chose the appropriate type and size of electrode -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead on piece of scrap metal -	____	____
9. Readjusted voltage, current, and inductance as required -	____	____
10. Prepared workpiece as required by specifications -	____	____
11. Deposited tack weld -	____	____
12. Chipped slag -	____	____
13. Wire brushed and/or ground as specified -	____	____
14. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Took Kit; Personal Safety Equipment; Grinder; SMAW Equipment (Duty B, Task 4)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 10

Task: Make fillet welds in a tee or lap joint using the shielded metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications -		
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. shielding gas and flow rate g. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -		
4. Checked that hood had required lens for welding process -		
5. Checked work area for hazards -		
6. Rechecked positioning of workpiece -		
7. Turned on welding machine -		
8. Ran test bead on piece of scrap metal -		
9. Readjusted voltage, current, and inductance as required -		
10. Ran fillet weld -		
11. Chipped slag -		
12. Wire brushed and/or ground as specified -		
13. Inspected weld -		
14. Measured weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment FCAW Equipment; Grinder (Duty B, Task 6)	

Duty: Performing Welding Activities

Duty No. D

Task No. 24

Task: Weld pipe using the flux cored arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Turned on welding machine -	____	____
7. Chose correct electrode type and size -	____	____
8. Chose correct gas type and CFH rate -	____	____
9. Ran test bead on piece of scrap metal -	____	____
10. Readjusted gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
11. Prepared workpieces as required by specifications -	____	____
12. Tack welded parts to insure location -	____	____
13. Welded root pass -	____	____
14. Wire brushed by hand and/or ground root pass smooth -	____	____
15. Welded filler pass(es), wire brushing as necessary -	____	____
16. Welded cover pass(es) -	____	____
17 Used post heat treatment (if required) -	____	____
18. Wire brushed by hand and/or ground smooth weldment as specified -	____	____
19. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment Grinder; FCAW Equipment (Duty B, Task 6)	**Resources:** 90

Duty: Performing Welding Activities

Duty No. D

Task No. 25

Task: Tack weld ferrous or nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. shielding gas and flow rate g. type and size of filler metal		
3. Put on protective attire -		
4. Checked that eye protection equipment had required lens for welding process -		
5. Checked work area for hazards, especially toxic gases -		
6. Rechecked positioning of workpiece -		
7. Turned on welding machine -		
8. Readjusted gas flow rate, voltage, current, and water flow -		
9. Deposited tack weld -		
10. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit;
Personal Safety Equipment;
GTAW Equipment (Duty B, Task 7)

Resources:

Duty: Performing Welding Activities	**Duty No.** D
	Task No. 2

Task: Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the gas tungsten arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. filler metal g. shielding gas and flow rate h. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead -	____	____
9. Readjusted gas flow rate, voltage, current, and water flow -	____	____
10. Ran fillet weld -	____	____
11. Wire brushed by hand and/or ground as specified -	____	____
12. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; GTAW Equipment (Duty B, Task 7)	

Duty: Performing Welding Activities

Duty No. D

Task No. 27

Task: Make plug or slot welds in ferrous and nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. filler metal g. shielding gas and flow rate h. position (flat, horizontal, vertical, overhead)	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Readjusted inert gas flow rate, voltage, current, and water flow -	____	____
9. Made plug weld -	____	____
10. Wire brushed by hand and/or ground as specified -	____	____
11. Visually inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; GTAW Equipment (Duty B, Task 7)	

Duty: Performing Welding Activities

Duty No. D

Task No. 2

Task: Make full penetration groove weld in ferrous or nonferrous metal using the gas tungsten arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. filler metal g. shielding gas and flow rate h. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Installed purge plates -	____	____
8. Turned on welding machine -	____	____
9. Readjusted inert gas flow rate, voltage, current, and water flow -	____	____
10. Ran root pass -	____	____
11. Wire brushed by hand and/or ground root pass as specified -	____	____
12. Ran filler pass(es), wire brushing as specified -	____	____
13. Wire brushed by hand and/or ground weldment as specified -	____	____
14. Visually inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment GTAW Equipment; Purge Plates (Duty B, Task 7)	

Duty: Performing Welding Activities	**Duty No.** D	
	Task No. 2	

Task: Weld ferrous or nonferrous pipe using the gas tungsten arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications -		
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. shielding gas and flow rate g. type and size of filler metal		
3. Put on protective attire -		
4. Checked that eye protection equipment had required lens for welding process -		
5. Checked work area for hazards, especially toxic gases -		
6. Rechecked positioning of workpiece -		
7. Feathered tacks -		
8. Turned on welding machine -		
9. Readjusted gas flow rate, voltage, current, and water flow -		
10. Welded root pass -		
11. Wire brushed or ground root pass smooth -		
12. Welded filler pass(es), wire brushing as specified -		
13. Welded cover pass(es) -		
14. Wire brushed by hand and/or ground smooth weldment as specified -		
15. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment; GTAW Equipment (Duty B, Task 7)	**Resources:**

Duty: Performing Welding Activities

Duty No. D

Task No. 3

Task: Make fillet welds in a tee or lap joint using the submerged arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode and flux f. position (flat, horizontal)		
2. Put on protective attire -		
3. Checked that eye protection equipment had required lens for welding process -		
4. Checked work area for hazards -		
5. Rechecked positioning of workpiece -		
6. Turned on welding machine -		
7. Ran test bead -		
8. Readjusted voltage, current, wire-feed rate, and flux-feed rate -		
9. Ran fillet weld -		
10. Wire brushed or ground weld as specified -		
11. Recycled unfused flux -		
12. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Semi-Automatic or Automatic Submerged Arc Welding Equipment (Duty B, Task 8)	

Duty: Performing Welding Activities

Duty No. D

Task No. 31

Task: Make plug or slot welds using the submerged arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. type of flux g. position (flat, horizontal)		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Readjusted voltage, current, wire-feed rate, and flux-feed rate -	____	____
9. Made plug weld -	____	____
10. Wire brushed by hand and/or ground weld as specified -	____	____
11. Recycled unfused flux -	____	____
12. Visually inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment; Semi-Automatic or Automatic Submerged Arc Welding Equipment; Grinder (Duty B, Task 8)	**Resources:**

Duty: Performing Welding Activities

Duty No. D

Task No. 32

Task: Make full penetration groove welds using the submerged arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. type of flux g. position (flat, horizontal)	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Readjusted voltage, current, wire-feed rate, and flux-feed rate -	____	____
9. Ran root pass -	____	____
10. Wire brushed by hand and/or ground root pass smooth, recycling unfused flux -	____	____
11. Ran filler pass(es), wire brushing and recycling unfused flux -	____	____
12. Wire brushed by hand and/or ground smooth weldment as specified in work order -	____	____
13. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e,, AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit; Personal Safety Equipment; Semi-Automatic or Automatic Submerged Arc Welding Equipment; Grinder (Duty B, Task 8)

Resources:

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit Personal Safety Equipment SMAW Equipment; Grinder (Duty B, Task 4)	106

Duty: Performing Welding Activities	**Duty No.** D
	Task No. 11

Task: Make plug or slot welds using the shielded metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -	____	____
4. Checked that hood had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead on piece of scrap metal -	____	____
9. Readjusted voltage, current, and inductance as required -	____	____
10. Made plug weld -	____	____
11. Chipped slag -	____	____
12. Wire brushed by hand and/or ground as specified -	____	____
13. Visually inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit Personal Safety Equipment SMAW Equipment; Grinder (Duty B, Task 4)	

Duty: Performing Welding Activities

Duty No. D

Task No. 12

Task: Make full penetration groove welds using the shielded metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yew	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications -		
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -		
4. Checked that hood had required lens for welding process -		
5. Checked work area for hazards -		
6. Rechecked positioning of workpiece -		
7. Turned on welding machine -		
8. Ran test bead on piece of scrap metal -		
9. Readjusted voltage, current, and inductance as required -		
10. Ran root pass -		
11. Chipped slag -		
12. Wire brushed by hand and/or ground root pass as specified -		
13. Ran filler pass(es), chipping slag and wire brushing as required -		
14. Ran cover pass(es) -		
15. Chipped slag -		
16. Wire brushed by hand and/or ground weldment as specified -		
17. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; SMAW Equipment; Grinder (Duty B, Task 4)	

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Duty: Performing Welding Activities

Duty No. D

Task No. 13

Task: Weld pipe using the shielded metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation		
b. surface cleaning		
c. joint fit up		
d. preheating		
e. type and size of electrode		
3. Put on protective attire -	____	____
4. Checked that hood had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead on piece of scrap metal -	____	____
9. Readjusted voltage, current, and inductance as required -	____	____
10. Prepared workpiece as required by specifications -	____	____
11. Welded root pass -	____	____
12. Chipped slag -	____	____
13. Wire brushed by hand and/or ground root pass smooth -	____	____
14. Welded filler pass(es), chipping slag and wire brushing as required -	____	____
15. Welded cover pass(es) -	____	____
16. Chipped slag -	____	____
17. Wire brushed and/or ground smooth weldment as specified -	____	____
18. Inspected weld -	____	____

Criteria:	Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Grinder; SMAW Equipment (Duty B, Task 4)	112

Duty: Performing Welding Activities

Duty No. D

Task No. 14

Task: Apply hard surfacing material using the shielded metal arc welding process to produce a wear resistant surface.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Consulted work order -		
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. position (flat, horizontal, vertical, overhead)		
3. Put on protective clothing -		
4. Positioned workpiece for welding -		
5. Selected electrodes -		
6. Preheated base metal for required soaking time -		
7. Adjusted amperage, voltage, and polarity -		
8. Built up surface to within 3/16" - 3/8" of final size -		
9. Positioned workpiece so that hard surfacing was done in horizontal position if possible -		
10. Applied hard surfacing material in two layers -		
11. Induced cross-checking when required -		
12. Post heated workpiece as required -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:
Welder's Standard Tool Kit;
Personal Safety Equipment;
SMAW Equipment
(Duty B, Task 4)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 15

Task: Make tack welds on ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Put on protective attire -	____	____
4. Checked that hood had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Chose the appropriate type and size of electrode -	____	____
7. Chose the appropriate shielding gas and flow rate -	____	____
8. Turned on welding machine -	____	____
9. Ran test bead on piece of scrap metal -	____	____
10. Readjusted voltage, current, and inductance as required -	____	____
11. Prepared workpiece as required by specifications -	____	____
12. Deposited tack weld -	____	____
13. Chipped slag -	____	____
14. Wire brushed and/or ground as specified -	____	____
15. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment GMAW Equipment; Grinder (Duty B, Task 5)	**Resources:**

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 16

Task: Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode and filler metal f. shielding gas and flow rate g. position (flat, horizontal, vertical, overhead)	____	____
2. Put on protective attire -	____	____
3. Checked that eye protection equipment had rqeuired lens for welding process -	____	____
4. Checked work area for hazards -	____	____
5. Rechecked positioning of workpiece -	____	____
6. Turned on welding machine -	____	____
7. Ran test bead on piece of scrap metal -	____	____
8. Readjusted inert gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
9. Ran fillet weld -	____	____
10. Wire brushed by hand and/or ground as specified -	____	____
11. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit;
Personal Safety Equipment;
GMAW Equipment
(Duty B, Task 5)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 17

Task: Make plug or slot welds using the gas metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode - f. shielding gas and flow rate g. position (flat, horizontal, vertical, overhead)	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had rqeuired lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead on piece of scrap metal -	____	____
9. Readjusted inert gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
10. Made plug weld -	____	____
11. Wire brushed by hand and/or ground as specified -	____	____
12. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; GMAW Equipment; Grinder (Duty B, Task 5)	

Duty: Performing Welding Activities

Duty No. D

Task No. 18

Task: Make full penetration groove welds in ferrous or nonferrous metal using the gas metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. shielding gas and flow rate g. gas backing h. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead on piece of scrap metal -	____	____
9. Readjusted gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
10. Ran root pass -	____	____
11. Wire brushed or ground root pass as specified -	____	____
12. Ran filler pass(es), wire brushing as necessary -	____	____
13. Wire brushed by hand and/or ground smooth weldment as specified -	____	____
14. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; GMAW Equipment; Grinder (Duty B, Task 5)	

Duty: Performing Welding Activities

Duty No. D

Task No. 19

Task: Weld ferrous or nonferrous pipe using the gas metal arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Put on protective attire -		
4. Checked that eye protection equipment had required lens for welding process -		
5. Checked work area for hazards -		
6. Turned on welding machine -		
7. Chose correct electrode type and size -		
8. Chose correct gas type and CFH rate -		
9. Ran test bead on piece of scrap metal -		
10. Readjusted gas flow rate, voltage, current, wire-feed speed, and inductance -		
11. Prepared workpiece as required by specifications -		
12. Tack welded parts to insure location -		
13. Welded root pass -		
14. Wire brushed by hand and/or ground root pass smooth -		
15. Welded filler pass(es), wire brushing as necessary -		
16. Welded cover pass(es) -		
17. Used post heat treatment (if required) -		
18. Wire brushed by hand and/or ground smooth weldment as specified -		
19. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment: Welder's Standard Tool Kit; Personal Safety Equipment; GMAW Equipment (Duty B, Task 5) (Duty B, Task 5)	**Resources:**

Duty: Performing Welding Activities

Duty No. D

Task No. 20

Task: Make tack welds using the flux cored arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3. Put on protective attire -	____	____
4. Checked that hood had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Chose the appropriate type and size of electrode -	____	____
7. Chose the appropriate shielding gas and flow rate -	____	____
8. Turned on welding machine -	____	____
9. Ra[illegible]t bead on piece of scrap metal -	____	____
10. Readjusted voltage, current, and inductance as required -	____	____
11. Prepared workpiece as required by specifications -	____	____
12. Deposited tack weld -	____	____
13. Chipped slag -	____	____
14. Wire brushed and/or ground as specified -	____	____
15. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit; Personal Safety Equipment; GMAW Equipment; Grinder (Duty B, Task 6)

Resources:

Duty: Performing Welding Activities

Duty No. D

Task No. 21

Task: Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the flux cored arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Consulted work order for weld specifications -	____	____
a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode and filler metal f. shielding gas and flow rate g. position (flat, horizontal, vertical, overhead)		
2. Put on protective attire -	____	____
3. Checked that eye protection equipment had required lens for welding process -	____	____
4. Checked work area for hazards -	____	____
5. Rechecked positioning of workpiece -	____	____
6. Turned on welding machine -	____	____
7. Ran test bead on piece of scrap metal -	____	____
8. Readjusted inert gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
9. Ran fillet weld -	____	____
10. Wire brushed by hand and/or ground as specified -	____	____
11. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:
Welder's Standard Tool Kit;
Personal Safety Equipment;
FCAW Equipment; Grinder
(Duty B, Task 6)

Resources:

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 22

Task: Make plug or slot welds using the flux cored arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Turned on welding machine -	____	____
7. Chose correct electrode type and size -	____	____
8. Chose correct gas type and CFH rate -	____	____
9. Ran test bead on piece of scrap metal -	____	____
10. Readjusted gas flow rate, voltage, current, wire-feed speed, and inductance -	____	____
11. Prepared workpieces as required by specifications -	____	____
12. Tack welded parts to insure location -	____	____
13. Welded root pass -	____	____
14. Wire brushed by hand and/or ground root pass smooth -	____	____
15. Welded filler pass(es), wire brushing as necessary -	____	____
16. Welded cover pass(es) -	____	____
17. Used post heat treatment (if required) -	____	____
18. Wire brushed by hand and/or ground smooth weldment as specified -	____	____
19. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Sfaety Equipment; FCAW Equipment; Grinder (Duty B, Task 6)	130

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 23

Task: Make full penetration groove welds using the flux cored arc welding process to produce a welded assembly.

Achievement Indicators: The learner:		Yes	No
1.	Practiced safety rules -		
2.	Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating		
3.	Put on protective attire -		
4.	Checked that eye protection equipment had required lens for welding process -		
5.	Checked work area for hazards -		
6.	Turned on welding machine -		
7.	Chose correct electrode type and size -		
8.	Chose correct gas type and CFH rate -		
9.	Ran test bead on piece of scrap metal -		
10.	Readjusted gas flow rate, voltage, current, wire-feed speed, and inductance -		
11.	Prepared workpieces as required by specifications -		
12.	Tack welded parts to insure location -		
13.	Welded root pass -		
14.	Wire brushed by hand and/or ground root pass smooth -		
15.	Welded filler pass(es), wire brushing as necessary -		
16.	Welded cover pass(es) -		
17.	Used post neat treatment (if required) -		
18.	Wire brushed by hand and/or ground smooth weldment as specified -		
19.	Inspected weld -		

Duty: Performing Welding Activities	**Duty No.** D **Task No.** 33

Task: Weld pipe using the submerged arc welding process to produce a welded assembly.

Achievement Indicators: The learner:

	Yes	No
1. Practiced safety rules -		
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. size and type of electrode and flux		
3. Put on protective attire -		
4. Checked that eye protection equipment had required lens for welding process -		
5. Checked work area for hazards -		
6. Rechecked positioning of workpiece -		
7. Turned on welding machine -		
8. Readjusted voltage, current, wire-feed rate, and flux-feed rate -		
9. Welded root pass -		
10. Wire brushed by hand and/or ground root pass smooth, recycling unfused flux -		
11. Welded filler pass(es), wire brushing and recycling unfused flux -		
12. Welded cover pass(es) -		
13. Recycled unfused flux -		
14. Wire brushed by hand and/or ground smooth weldment as specified in work order -		
15. Inspected weld -		

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Electrode Wire; Flux; Semi-Automatic or Automatic Submerged Arc Welding Equipment (Duty B, Task 8)	

Duty: Performing Welding Activities

Duty No. D

Task No. 34

Task: Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the plasma arc welding process to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications - a. edge preparation b. surface cleaning c. joint fit up d. preheating e. type and size of electrode f. filler metal g. shielding gas and flow rate h. position (flat, horizontal, vertical, overhead)	____	____
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test bead -	____	____
9. Readjusted gas flow rate, voltage, current, and water flow -	____	____
10. Ran fillet weld -	____	____
11. Wire brushed by hand and/or ground as specified -	____	____
12. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Plasma Arc Welding Equipment (Duty B, Task 10)	

Duty: Performing Welding Activities

Duty No. D

Task No. 35

Task: Make full penetration groove welds in ferrous or nonferrous metal using the plasma arc welding process to produce a welded assembly.

Achievement Indicators: The learner: Yes No

1. Practiced safety rules - _____ _____
2. Consulted work order for welded specifications - _____ _____
    a. edge preparation
    b. surface cleaning
    c. joint fit up
    d. preheating
    e. type and size of electrode
    f. filler metal
    g. shielding gas and flow rate
    h. position (flat, horizontal, vertical overhead)
3. Put on protective attire - _____ _____
4. Checked that eye protection equipment had required lens for welding process - _____ _____
5. Checked work area for hazards - _____ _____
6. Rechecked positioning of workpiece - _____ _____
7. Turned on welding machine - _____ _____
8. Readjusted glas flow rate, voltage, current, and water flow - _____ _____
9. Deposited weld - _____ _____
10. Wire brushed/ground weldment as specified - _____ _____
11. Inspected weld - _____ _____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:	**Resources:**
Welder's Standard Tool Kit; Personal Safety Equipment; Plasma Arc Welding Equipment (Duty B, Task 10)	

Duty: Performing Welding Activities

Duty No. D

Task No. 36

Task: Operate a resistance welding machine using the foot pedal or trigger to produce a welded assembly.

Achievement Indicators: The learner:	Yes	No
1. Practiced safety rules -	____	____
2. Consulted work order for weld specifications -	____	____
a. type and size of electrode b. position (flat, horizontal, vertical, overhead)		
3. Put on protective attire -	____	____
4. Checked that eye protection equipment had required lens for welding process -	____	____
5. Checked work area for hazards -	____	____
6. Rechecked positioning of workpiece -	____	____
7. Turned on welding machine -	____	____
8. Ran test weld on pieces of scrap meal -	____	____
9. Readjusted voltage, current, pressure, and weld-time -	____	____
10. Wire brushed by hand and/or ground smooth weldment as specified -	____	____
11. Inspected weld -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to industrial codes and specifications (i.e., AWS Structural Welding Code).

Tools and Equipment:

Welder's Standard Tool Kit;
Personal Safety Equipment;
Resistance Welding ("Spot" Welding) Machine

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 1

Task: Investigate employment information using sources of employment information to identify employment opportunities.

Achievement Indicators: The learner:

	Yes	No
1. Developed a list of the prime sources of information concerning opportunities for employment -	____	____
2. Described special procedures, if any, required to utilize services, information, etc. -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 2

Task: Identify job requirements using health, physical, legal, education, and other occupational information to determine the requirements of an occupation.

Achievement Indicators: The learner: Yes No

1. Listed the significant requirements (health, physical, legal, education, etc.) of the appropriate occupation - ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 3

Task: Acquire wage information using available resources to determine the approximate entry wages, general wage range, and significant fringe benefits for an occupation.

Achievement Indicators: The learner:	Yes	No
1. Listed the approximate entry wages, general wage range, and significant fringe benefits for the appropriate occupation -	____	____
2. Compared these wages and fringe benefits with other selected occupations -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 4

Task: Identify significant non-wage job characteristics using available resources to determine shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment and other significant job factors.

Achievement Indicators: The learner:

	Yes	No
1. Listed and described the significant non-wage characteristics (e.g., shift requirements, union affiliation, apprenticeships, occupational hazards, characteristics of work environment, etc.) -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills	**Duty No.** E **Task No.** 5

Task: Explore employment opportunities using available resources to describe local, regional, and national employment opportunities for an occupation.

Achievement Indicators: The learner:

	Yes	No
1. Described the local, regional, and national employment opportunities for the appropriate occupation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills

Duty No. E

Task No. 6

Task: Analyze career ladder using available resources to describe job progression in an occupation.

Achievement Indicators: The learner:

	Yes	No
1. Described the career ladder associated with the appropriate occupational area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills	**Duty No.** E **Task No.** 7

Task: Identify personal criteria with information about available alternatives using a decision-making situation and procedures and skills in decision-making to choose a job, further training or other alternatives.

Achievement Indicators: The learner:

	Yes	No
1. Compared personal criteria with information about a job, further training or other alternatives -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills

Duty No. E

Task No.

Task: Prepare a resume using personal information to apply for a job.

Achievement Indicators: The learner:

	Yes	No
1. Prepared a resume -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills	**Duty No.** E
	Task No. 9

Task: Write a letter of application using personal notes to apply/inquire about a job.

Achievement Indicators: The learner: Yes No

1. Wrote a letter of application/inquiry - ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** E
	Task No.

Task: Complete a job application using personal notes to apply for a job.

Achievement Indicators: The learner: Yes No

1. Completed a job application - ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** E
	Task No. 11

Task: Demonstrate appropriate dress using a knowledge of job requirements to comply with standards of on-the-job dress and grooming.

Achievement Indicators: The learner:

	Yes	No
1. Described and/or dressed in the attire of the appropriate occupational area, including:		
a. grooming -	____	____
b. required health and safety equipment -	____	____
c. uniforms -	____	____
d. other ______________________________ -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No.

Task: Complete a job interview using communication and interpersonal skills to become employed.

Achievement Indicators: The learner:	Yes	No
1. Described and/or demonstrated appropriate characteristics for job applicants including:		
a. attire -	____	____
b. grooming -	____	____
c. conduct during the interview -	____	____
2. Described and/or demonstrated the interview process -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills	**Duty No.** E
	Task No. 13

Task: Describe personal criteria using references to identify acceptable job offers.

Achievement Indicators: The learner:

	Yes	No
1. Listed personal criteria (financial, social, etc.) which described a job offer -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills

Duty No. E

Task No. 1[illegible]

Task: Demonstrate interpersonal skills to achieve successful relationships with others.

Achievement Indicators: The learner:

Yes No

1. Identified probable causes for conflicts and at least one possible action to relieve the conflict - ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 15

Task: Identify source of continuing education for an occupation using available resources to identify career ladder alternatives.

Achievement Indicators: The learner:	Yes	No
1. Described the types and sources of related continuing education for the appropriate occupation and/or advancement within the career ladder associated with the occupation -	_____	_____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

Duty: Using Employability Skills

Duty No. E

Task No. 1

Task: Describe job termination procedures using a knowledge of the occupational area to leave a particular job.

Achievement Indicators: The learner:

	Yes	No
1. Described procedures and practices for terminating a job -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to the satisfaction of the supervisor.

Tools and Equipment:

Resources:

TOOL AND EQUIPMENT SETS

Items included in the Welder's Standard Tool Kit and the Personal Safety Equipment lists may not have to be issued to every student at all times, but should be available when needed for the task being performed.

WELDER'S STANDARD TOOL KIT

Allen wrench set
C-Clamps
Center punch
Channel-lock pliers
Chipping hammer
Cold chisel
File, flat
File, half-round
Hammer, ball peen
Pliers, wire cutting
Pliers, 8"
Screwdrivers, philips and regular
Soapstone
Spark lighter
Tape measure
Tip cleaners
Visegrips, 8"
Wirebrush
Wrench, adjustable 12"
Wrench, combination tank
Wrench, key

PERSONAL SAFETY EQUIPMENT

Glasses, safety
Gloves, gauntlet
Goggles, cutting
Helmet, welding
Leathers
Lenses, welding and cutting replacements

SHOP EQUIPMENT

Anvil
Fire extinguishers
Sledge hammer

STUDENT ACHIEVEMENT RECORD

WELDING OCCUPATIONS

STUDENT ______________________________

INSTRUCTIONS:

Mark each student's level of competence according to the following guide:

LEVEL	GUIDE
1	Student has been exposed to task
2	Task accomplished with assistance
3	Task accomplished to criteria by student
4	Ability to teach or demonstrate the task to others

TASK	LEVEL	DATE
A. PERFORMING SUPPORTING ACTIVITIES		
1. Operate tools, equipment, and machinery related to welding.		
2. Determine the size, shape, and location of parts.		
3. Determine the type and size of the specified weld.		
4. Identify type of metal.		
5. Shape steel to remove distortion.		
6. Operate tools, equipment, and machinery related to welding to perform safe and efficient operations.		
B. SETTING UP WELDING OR CUTTING EQUIPMENT		
1. Set up oxy-fuel welding equipment to prepare a work station.		
2. Set up oxy-fuel cutting equipment to prepare a work station.		
3. Set up air-carbon cutting or gouging equipment.		

TASK	LEVEL	DATE
B. SETTING UP WELDING OR CUTTING EQUIPMENT (continued)		
4. Set up shielded metal arc welding equipment.		
5. Set up gas metal arc welding equipment.		
6. Set up flux cored arc welding equipment.		
7. Set up gas tungsten arc welding equipment.		
8. Set up submerged arc welding equipment.		
9. Set up plasma arc welding equipment.		
10. Set up plasma arc cutting equipment.		
C. PERFORMING CUTTING ACTIVITIES		
1. Cut metal using a hand held oxy-fuel torch.		
2. Cut metal using an automatic oxy-fuel torch.		
3. Cut metal using a hand held plasma arc torch.		
4. Cut metal using an automatic plasma arch torch.		
5. Cut or gouge metal using air-carbon arc equipment.		
D. PERFORMING WELDING ACTIVITIES		
1. Make tack welds using the oxy-fuel process.		
2. Make fillet welds in a tee or lap joint using the oxy-fuel process.		
3. Make plug or slot welds using the oxy-fuel process.		
4. Make full penetration groove welds using the oxy-fuel process.		
5. Weld pipe using the oxy-fuel welding process.		
6. Apply hard surfacing material using the oxy-fuel process.		
7. Braze weld metal using the oxy-fuel process.		
8. Silver braze ferrous and nonferrous metal using the oxy-fuel process.		
9. Make tack welds using the shielded metal arc welding process.		
10. Make fillet welds in a tee or lap joint using the shielded metal arc welding process.		

TASK	LEVEL	DATE
D. PERFORMING WELDING ACTIVITIES (continued)		
11. Make plug or slot welds using the shielded metal arc welding process.		
12. Make full penetration groove welds using the shielded metal arc welding process.		
13. Weld pipe using the shielded metal arc welding process.		
14. Apply hard surfacing material using the shielded metal arc welding process.		
15. Make tack welds on ferrous or nonferrous metal using the gas metal arc welding process.		
16. Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the gas metal arc welding process.		
17. Make plug or slot welds using the gas metal arc welding process.		
18. Make full penetration groove welds in ferrous or nonferrous metal using the gas metal arc welding process.		
19. Weld ferrous or nonferrous pipe using the gas metal arc welding process.		
20. Make tack welds using the flux cored arc welding process.		
21. Make fillet welds in a tee or lap joint of ferrous or nonferrous metal using the flux cored arc welding process.		
22. Make plug or slot welds using the flux cored arc welding process.		
23. Make full penetration groove welds using the flux cored arc welding process.		
24. Weld pipe using the flux cored arc welding process.		
25. Tack weld ferrous or nonferrous metal using the gas tungsten arc welding process.		

TASK	LEVEL	DATE
D. PERFORMING WELDING ACTIVITIES (continued)		
26. Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the gas tungsten arc welding process.		
27. Make plug or slot welds in ferrous and nonferrous metals using the gas tungsten arc welding process.		
28. Make full penetration groove weld in ferrous or nonferrous metal using the gas tungsten arc welding process.		
29. Weld ferrous or nonferrous pipe using the gas tungsten arc welding process.		
30. Make fillet welds in a tee or lap joint using the submerged arc welding process.		
31. Make plug or slot welds using the submerged arc welding process.		
32. Make full penetration groove welds using the submerged arc welding process.		
33. Weld pipe using the submerged arc welding process.		
34. Make fillet welds in a tee or lap joint of ferrous or nonferrous metals using the plasma arc welding process.		
35. Make full penetration groove welds in ferrous or nonferrous metal using the plasma arc welding process.		
36. Operate a resistance welding machine using the foot pedal or trigger to produce a welded assembly.		
E. USING EMPLOYABILITY SKILLS		
1. Investigate employment information.		
2. Identify job requirements.		
3. Acquire wage information.		
4. Identify significant non-wage job characteristics.		
5. Explore employment opportunities.		
6. Analyze career ladder.		
7. Identify personal criteria.		

TASK	LEVEL	DATE
E. USING EMPLOYABILITY SKILLS (continued)		
8. Prepare a resume.		
9. Write a letter of application		
10. Complete a job application.		
11. Demonstrate appropriate dress.		
12. Complete a job interview.		
13. Describe personal criteria.		
14. Demonstrate interpersonal skills.		
15. Identify source of continuing education for an occupation.		
16. Describe job termination procedures.		

CLASS ACHIEVEMENT RECORD

NAME TASK No.																							

GLOSSARY OF VOCATIONAL TERMS

Advisory Committee. An appointed group of concerned citizens and educators representative of the occupations for which training is given in the local school, organized for the purpose of helping to plan vocational programs and offering counsel on their development and operation.

Apprenticeship. An instructional program in which the learner works directly under a qualified craft worker to learn a trade.

Career Development. A lifelong process involving a series of experiences, decisions, and interactions, which, taken cumulatively, results in the formulation of a viable self concept and provides the means through which that self concept can be implemented both vocationally and avocationally.

Career Education. The total effort of public education and the community to help all individuals become familiar with the values of a work-oriented society, to integrate such values into their personal value systems, and to implement those values into their lives in such a way that work becomes possible, meaningful, and satisfying to each individual.

Career Interest. The student's decision to pursue a job description or cluster within a vocational education program area.

Cluster of Occupations. Occupations for which a common core of instruction can prepare, as for example automotive trades which prepares for such occupations as auto mechanic, auto body repairman, automotive services, auto inspector, and brake adjuster.

Completion. That statistic which describes individuals, including early leavers who have achieved their immediate objectives in preparation for entry or progressing in an occupational field and have left the vocational education program.

Cooperative Vocational Education. An instructional plan which combines learning experiences gained through regularly scheduled supervised employment in the community and vocationally oriented in-school instruction.

Coordinator (Cooperative Education). A member of a local school staff who teaches occupational and related subject content to students preparing for employment and coordinates the efforts of all helpful agencies which can assist in a training program designed to meet the needs of learners in a cooperative vocational education program. At times the coordinator may have varying degrees of responsibility in adult vocational education.

Course. A defined segment of a program.

Course Outline. An outline of subject matter to be presented or learning experiences planned for a course.

Course of Study. A guide prepared by administrators, supervisors, and teachers of a particular school or school system as an aid to teaching a given subject or area of study. More detailed than a course outline and includes statement of methods, materials, and equipment needed.

Curriculum. A sequence of educational and skill development experiences designed to accomplish a particular purpose. The curriculum for a program of vocational/technical education is designed to prepare an individual for entry, promotion, or upgrading in a specific occupation or cluster of occupations. (See definition of Cluster of Occupations.)

Disability. An injury or illness, temporary or permanent, which prevents workers from carrying on their usual occupations. A disability retirement is retirement because of physical inability to perform the job.

Disadvantaged. Disadvantaged persons are those who have academic, socioeconomic, cultural, or other handicaps that prevent them from succeeding in a regular vocational program designed for persons without such handicaps, and who for that reason require specially-designed educational programs and related services, or both, in order for them to benefit from a vocational program.

Discharge. Dismissal of a worker from employment. The term implies discipline for unsatisfactory performance and thus is usually limited to dismissals for such reasons as insubordination, absenteeism, or inefficiency.

Discrimination. Unequal treatment of workers in hiring, employment, pay or conditions of work because of race, national origin, creed, color, sex, age, union memebership activity, or any other characteristics not related to ability or job performance. Discrimination is prohibited by Federal, State, and local laws.

Duty. A large segment of work performed by an individual. It is one of the distinct major activities involved in the work performed, and it is composed of several related tasks.

Employer. General term for any individual, corporation, or other operating group which hires workers. The term "employer" and "management" are often used interchangeably.

Evaluation. A measuring or assessing of effectiveness. An on-going process by which effectiveness and progress are determined, used to guide change and offer directions for program modification and operation.

Exploratory Experiences. Those experiences in a variety of occupations, which help the students identify job traits in relation to their abilities and characteristics, and to assist them in making realistic and appropriate occupational choices.

Follow-Up Report. Usually a composite short-term or long-term report of former students indicating their present employment status or other present commitments (education, military, homemaking). More sophisticated follow-up studies seek to assess the effectiveness of the cooperative training experience to the student's present situation. Individual follow-up information is usually maintained in a student's record file.

Follow-Up Study. A study of the occupational status and progress of former students, as a means of evaluating effectiveness of the school's program of occupational preparation, of improving such preparation, and/or of determining needs of former students for further services.

General Advisory Committee. A committee that advises an institution as to its vocational/technical education activities overall. (See also; Occupational Advisory Committee).

Guidelines. The means by which significant characteristics in the evaluation of an institution or program are identified or measured.

Handicapped. Handicapped persons are those who are mentally-retarded, hard of hearing, deaf, speech-impaired, visually-handicapped, seriously emotionally disturbed, crippled, or other health-impaired persons who, by reason of their handicapping conditions, cannot succeed in a regular vocational or consumer and homemaking education program without special educational assistance, or who require a modified vocational program.

Hazardous Occupation. An occupation designated by State of Michigan and/or federal law to be considered dangerous to the health and well-being of minors.

Individualized Instruction. That type of instruction that provides techniques through which the teacher can work directly with individual students, as opposed to group instruction.

Inservice Teacher Education. All educational, and professional activities contributing to professional competencies which a person engages in after becoming employed, such as: formal course work, work experience, internships, practicums, seminars, and independent-individualized studies.

Internship. Student performs in approved job situation. Usually paid and given credit for the work. In-school instruction usually given before the work period and seldom tied in directly with job experiences. Typically one semester or more. Internship is a term used for collegiate experiences.

Job. The duties and tasks actually performed by a specific individual.

Job Analysis. See: Occupational Analysis.

Job Description. A written statement listing the elements of a particular job or occupation. The statement may include the purpose of the job, duties, equipment used, qualifications, training requirements, physical and mental demands, and working conditions.

Job Placement. Those organized activities performed by a guidance counselor or job placement coordinator designed to assist students in locating employment.

Job Type. A group of jobs that are composed of essentially the same significant duties and tasks.

Learning Resources. All textbooks, reference materials, equipment, supplies and other items and materials needed for successful achievement of learning objectives.

Manpower. People available to perform needed labor.

Management System. A technique employed to provide an organized method of accomplishing stated mission, goals, and objectives.

Minimum Wage. The lowest rate of pay, established by law or through collective bargaining, at which covered workers may be employed. The minimum wage is usually expressed as an hourly rate.

M.O.I.S. Michigan Occupational Information System.

National Occupational Competency Exam. A written and a performance exam developed by the National Occupational Competency Testing Institute, sponsored by T&I Education, for the purpose of determining the degree of competency that one has in a specific trade and industrial occupation.

Occupational Analysis. A technique for finding out what a worker in a specific occupation does and what he needs to know to perform his job efficiently, which is then used as a means of determining the teaching content in an occupational preparatory program.

Occupational Advisory Committee. A committee advising as to a program preparing for a particular occupation or cluster of occupations.

Occupational Competence. Includes technical knowledge and skills; manipulative skills; communication skills; human relations skills; work habits; and the ability to reason, to solve problems, to think independently, and to make judgments necessary for satisfactory employment in the occupation.

Occupational Field. A group of recognized occupations having many similarities, including the following characteristics in common; the type of work performed; the basic aptitudes, and the acquired knowledge and training required; the tools, machines, instruments, and other equipment used; and the basic materials used.

Occupational Objective. An occupational goal, selected by the student, the attainment of which is the purpose for his/her vocational instruction.

On-The-Job Training. Instruction in the performance of a sequentially planned task given a student-learner by the employer during the usual working hours of the occupation. Learning experiences at the training station comprises both the application of the theory of and the technical skill aspects of the learning situation, and/or the proper character, attitude and personality development of the student-learner as general goals of the training situation at the training station.

Occupational Information. Systematically organized data used by guidance personnel and others for the purpose of helping persons make a vocational choice. Material concerns the nature of the work, duties, responsibilities, and compensations involved in the several vocations, including information about employment outlook, promotional opportunities, and entrance requirements.

Occupational Objective. A specific recognized occupational goal, selected by the student, the attainment of which is the purpose of his vocational instruction. Also called: Career Objective.

Placement Coordinator. A person who provides local leadership to plan and initiate placement services.

Placement Services or Placement Activities. A series of coordinated activities for students planning further education or seeking part-time or full-time employment either for additional education, for on-the-job training or for earning a living.

Preparatory Instruction. Instruction preparing students for full or part-time employment. Also serves to prepare students to enter and advance in an occupation. Also serves to equip workers with new or different skills demanded by technological changes.

Preparatory Program. A preparatory program provides vocational instruction designed to prepare individuals for gainful employment as semi-skilled or skilled workers or technicians or semi-professionals in recognized occupations. Preparatory programs are provided in the school laboratory/classroom.

Professional Organizations. Groups of personnel interested in and working toward the improvement, advancement, and upgrading of activities, not only in their specific field, but also of activities in related fields of endeavor such as the American Vocational Association.

Program (Vocational Education). "Vocational program" means laboratory, simulation or instruction based upon individually designed learning experiences in a vocational subject preparing the student for competencies required in a recognized occupation coded in accordance with the most recent vocational education listing of programs by the United States Department of Education.

Related Vocational Instruction. In-school courses specifically designed to improve personal and social skills, provide needed basic education (remedial), and/or develop relevant occupational skills and knowledges. The course should be regularly scheduled, should complement the learning experiences at the training station, and should be planned and developed to meet the specific needs of the individual student. The content of this course should consist of the theory of the occupational skill, the specific related information, and the general related instruction necessary to achieve personal success in the world of work.

Resources. People, money and materials available to an institution in carrying out its purposes.

School Community. The total community from which the school draws students, support, and resources.

School District. An administrative unit at the local level which exists primarily to operate public schools or to contract for public school services. Normally, taxes can be levied by such units for school purposes. These units may or may not be coterminous with county, city or town boundaries. This term is used synonymously with the term "local basic administrative unit."

Skills. The acquisition of knowledge, ability, proficiency, dexterity and technical expertness that enables one to develop a learned power of doing a thing completely.

State Plan. The document submitted by the state board for vocational education to the U. S. Office of Education describing the state's vocational education program. Includes policies followed by the state in maintaining, extending, and implementing existing programs and establishing new programs to meet the intent of the Vocational Education Acts. Prerequisite for receiving federal funds under the Acts.

Survey, Community. A fact-finding study of socioeconomic conditions and resources, community agencies, industries, business, farming, institutional practices, problems and practices of families, etc., as they exist at a given time in a given community. It is generally used by the school as a guide in revising school offerings to meet local needs.

Survey, Occupational. A form of occupational census, taken by personnel trained to determine the number of qualified employees in a designated occupation in a specified geographic or economic area; and to evaluate the need for increasing or limiting the numbers available for employment in the occupations surveyed.

Task. A unit of worker activity that is intermediate in specificity between a function and a procedural work step or action. It is a discrete unit of work performed by an individual; that is, the unit usually has a definite beginning and ending, and it is performed within a limited period of time.

Task Analysis. A detailed listing of skills necessary to perform a clearly defined, specific job, organized into a logical sequence and which may be used for teaching employment, or classification purposes.

Task Inventory. An instrument used for conducting an occupational survey. It consists of items of identification and background information and a list of appropriate duty and task statements.

Teacher-Coordinator (Cooperative Vocational Education). A member of the local school staff who teaches technical and related subject matter to students preparing for employment and coordinates classroom instruction (related classroom) with learning activities at the training station. The coordinator is also responsible for the evaluation procedures of the program.

Trade and Industrial. Instruction planned to develop basic manipulative skills, safety practices, judgments, technical knowledge, and related occupational information for the purpose of preparing persons for initial employment in the trades and industrial occupations.

Training Agreement. A statement of fundamental agreements regarding the participation of a student in a work environment. Initiated by the school, the agreement reflects a voluntary and cooperative commitment on the part of the coordinator, employer, student, and parents/guardians.

Training Plan. A format for delineating, for each student, the learning experiences and tasks to be undertaken at the training station, often paralleled with classroom units of instruction. The training plan, cooperatively determined, usually becomes a part of the training agreement.

Training Station. The establishment providing learning experience for the student-learner.

VICA. Vocational Industrial Clubs of America. The youth organization for students at secondary and post-secondary levels who are in preparation for employment in trade & industrial occupations.

Vocational Education. Organized educational programs, services, and activities which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree.

Vocational Student Organizations. Organizations for student-learners that complement the vocational education program. Recognized student-learner organizations for vocational education are: DECA, Distributive Education Clubs of America; FFA, Future Farmers of America; FHA-HERO, Future Homemakers of America-Home Economics Related Occupations; HOSA, Health Occupations Students of America; OEA, Office Education Association at the post-secondary level in Michigan and BOEC, Business Office Education Clubs at the secondary level; VICA, Vocational Industrial Clubs of America. Organizations for students enrolled in vocational education programs, with national, state and local units, the activities of which are an integral part of the instructional program.

Work Experience and Career Exploration (WECEP). Program emphasizes learning experiences at the training station based on individual needs and provides learning experiences for those students whose needs cannot be served by regular cooperative education programs.

Work Experience Program. Students perform tasks of the actual job and may or may not be paid. Typically engaged in for general education values, including exploratory. Usually one semester or less. Limited school supervision; usually no related class.

Work Observation Program. Student observes work, does not perform tasks except to understand them. Unpaid. Plan is usually few weeks in length and may be tied in with a class in which occupational information is discussed.

Work-Study Program. A federal program designed to provide a vocational education student with employment in the public sector and supplemental income while attending school. The vocational program does not necessarily have to be related to the job.

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e. Shielded Metal-Arc Welding (Basic) - EW-269: SMAWB

f. Shielded Metal-Arc Pipe Welding (Uphill) - EW-269: SMAWPU

g. Blueprint Reading for Welders and Fillers - EW-459

h. Shielded Metal-Arc Welding Pipe (Downhill)

i. Gas Tungsten-Arc Welding - EW-269: GTAW

j. Symbols for Welding - EW-269

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